MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: FRANK OWEN STETSON.

VOL. XXXV. FEBRUARY, 1907. No. 2

The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; H. H. Cousins, Chemist, in charge of the Jamaica Weather Office; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

IN GENERAL.

From the 5th to 9th barometric pressure was high over the Iceland area and European Russia and low over middle-western and southwestern Europe; this was a period of cold weather in western and southwestern Europe. From the 18th to 23d barometric pressure was low over the Iceland area and northern Europe and high over the central Siberian district; during this period the British, North Sea, and northern European coasts were storm swept. Azores pressure was uniformly high except from the 23d to 26th.

In the United States February was generally a cold month east of the Mississippi River, and from the upper Ohio Valley to the middle Atlantic and New England coasts the deficiency in temperature was more than 6°. West of the Mississippi the temperature averaged above the normal, the greatest excess being shown in the middle districts between the Rocky Mountain and Pacific coast ranges of mountains.

The month opened cold in central and northern districts between the Mississippi River and the Rocky Mountains, and the cold gradually extended thence eastward to the Atlantic and middle and east Gulf coasts. On the 4th a temperature of 50° below zero was reported at Solon Springs, Wis. From the 4th to 9th freezing temperatures occurred in the east Gulf States, on the 8th and 9th in northern counties of Florida, and on the 7th temperatures below zero were noted in Atlantic coast States north of Virginia.

On the 4th and 5th heavy snow fell in the Middle Atlantic and New England States, and on the latter date the snowfall in New England varied from six to thirteen inches. On the 11th a fall of one and one-half inches of snow was reported at Mexico, Mex. On the 23d and 24th a snowstorm extended from the Ohio Valley over the Middle Atlantic and New England States. On the 15th and 16th heavy snow and high winds were reported at Valdez, Alaska.

The severest gale of the month on the Great Lakes occurred on the 1st. On the 5th the middle Atlantic and New England coasts were visited by a heavy windstorm.

BOSTON FORECAST DISTRICT.

The weather of the month was exceptionally cold, the monthly mean temperature for the entire district, 15.9°, being 6.9° below the February normal, and one of the lowest of record for this month. The coldest periods were the 7th, 12th, 13th, 23d, 24th, and 28th. The precipitation was nearly all snow. The snowfall was well distributed over the section; it somewhat exceeded that of the preceding month and was fully up to the average for February. Owing, however, to the low temperatures that generally obtained during the storms the snow was very dry, and the water equivalent, melted precipitation, was below the average, the monthly mean, 2.08 inches, being 1.63 inches below normal. The most severe storm occurred on the 5th, when from six to thirteen inches fell, the larger amounts being on the coast. This storm was accompanied by severe northeast gales that at the most exposed coast stations attained velocities of 70 miles per hour. There was no great loss or damage to shipping and little if any loss of life, and there were fewer destructive storms than usual for February. Warnings were displayed for the storms, but in one or two instances the announcements were somewhat late. There were no marked failures in the forecasts.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

The month, as a whole, was abnormally dry and warm thruout the district. The only severe weather worthy of note prevailed during the 3d, 4th, and 5th, when a cold wave occurred over the northwestern portion of the district and freezing temperatures were recorded southward into the southern portions of Texas and Louisiana. Cold-wave warnings were issued for portions of the district on the 2d and 4th, and freezing temperature warnings were issued for considerable areas on the 2d, 3d, and 5th, well in advance of the severe weather conditions. A general heavy frost, which was covered by warnings, occurred ovér Louisiana on the 9th. No warnings were issued during the second and third decades and no severe weather conditions occurred during that time. No general storms occurred along the west Gulf coast and no storm warnings were issued.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

There were only two pronounced cold periods, 3d–9th and 21st–23d, the temperatures during the rest of the month being about or somewhat above the normal. Rain or snow occurred frequently during the first and last weeks, but during the middle of the month the weather was mostly fair and seasonably pleasant. There were but two snowstorms of consequence, one on the 4th, the other (the heaviest of the winter) on the 23d.

Cold-wave warnings were ordered on the 2d, in advance of

the decided change to colder of the period 3d–6th.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.

The weather was milder than usual thruout the district, except in the eastern portion, and the cold waves were few and not, as a rule, severe. The only cold wave that swept the entire district was the one which appeared in the British northwest on the morning of February 1. It pushed southward and eastward, and by the morning of the 3d had practically covered the entire district, zero temperatures and below prevailing almost generally. The cold waves later in the month were moderate, and pushed down from Manitoba over the upper Lake region and the sections lying to the east of this district. Warnings were issued well in advance of these cold waves.

The storm which ushered in the cold wave during the 1st of the month caused gales on Lake Michigan. The storms later in the month were unimportant. Advisory messages were issued in advance to transportation companies that maintain winter service, and no casualties were reported.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.

The month was remarkable for the uniformly high temperatures that prevailed thruout the district. At many stations the monthly mean was the highest recorded. Precipitation was light on the eastern slope, while over the Plateau region there was a general excess.

The only cold wave of the month occurred in Wyoming and northeastern Colorado on the 2d; it was covered by special warnings issued on the 1st.—*P. McDonough, Local Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The beginning of the month was marked by showery weather in the northern portion of the State. A moderate depression off the Oregon coast moved rapidly southeastward thru northern California and Nevada. The presence of a high area off the coast of central California apparently prevented a direct southerly extension of the depression. A period of fair weather followed and on the 7th foehn effects were noticed in southern California, the air coming from the northeast over the mountains and resulting high temperatures being noticed. The pressure distribution for more than ten days was typical of fair, pleasant weather in California. On the 14th, however, local showers occurred at Sacramento and San José, a light thunderstorm occurring at the latter place. These isolated disturbances were not anticipated and are not easily explained without more detailed knowledge of local conditions. On the 16th a widespread but rather flat depression caused moderate rains thruout the State. As a disturbance it seemed to have little energy. On the 21st a well-marked depression, moving slowly, crost California to the valley of the Colorado.

The month as a whole was singularly free from deep and energetic northern coast disturbances. There were few frosts. The month was without storm warnings, a unique experience for the forecaster.—*Alexander G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.

The opening and closing days of the month were stormy. Between the 6th and the 23d the weather was unusually quiet, being controlled by a series of high pressure areas that caused light winds, mild temperatures, and clear weather to prevail. Timely warnings were issued for all storms, and no noteworthy casualties are known to have occurred on account of stress of weather. The rains attending the storms at the beginning of the month caused a flood in the Willamette River, a full account of which will be found elsewhere in this issue.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The flood in the lower Mississippi during January and February, 1907, was purely an Ohio River flood, as the Arkansas, Red, and Yazoo rivers were at moderate stages. The antecedent conditions responsible for its conception and development were described in the MONTHLY WEATHER REVIEW for January, 1907, and need not be repeated.

The river first rose above the flood stage of 45 feet at Cairo, Ill., on January 21, and did not fall below the flood stage of 16 feet at New Orleans, La., until March 6, a period of forty-five days. As a matter of fact the river at New Orleans rose to flood stage on January 14 on account of an earlier tide in the river, making in all fifty-two consecutive days of flood water.

Notwithstanding the fact that the crest stage of 40.3 feet at Memphis exceeded all previous records, the actual flood volume was less than those of 1897, 1903, and 1904. In 1903 at Memphis the river was above the flood stage for fifty-four days, but in 1907 for only twenty-two days, and at New Orleans for eighty-five days in 1903 against fifty-two days in 1907. The increased stage at Memphis in 1907 was due to the fact that there were no crevasses above, while in 1903 there were two in the Arkansas levee. The closure of Bayou Lafourche since 1903 also operated to somewhat increase the lower river stages between the mouth of the bayou and the mouth of the river. More complete mention is made of these points in the detailed report which follows. While there was much alarm at times, with a rush to the defense of the levees, and some extremely critical situations developed, the damage done was comparatively small, owing principally to the early season.

Warnings of the fullest character were issued from five to twenty days in advance, with daily forecasts until the waters subsided, and an inspection of the table following will show the high degree of accuracy attained:

Station.	Stage forecast.	Actual stage.	Difference.
	Feet.	*Feet.*	
Cairo, Ill	50.0 to 50.6	50.4	0.0
New Madrid, Mo	39.0	38.7	+0.3
Memphis, Tenn	40.0, a little over.	40.3	0.0
Helena, Ark	50.0, about.	50.4	−0.4
Arkansas City, Ark	52.0	52.1	−0.1
Greenville, Miss	47.5	47.3	+0.2
Vicksburg, Miss	50.0, close to.	49.7	+0.3
Natchez, Miss	49.5	48.9	+0.6
Baton Rouge, La	37.0 to 38.0	37.3	0.0
New Orleans, La	20.0	19.8	+0.2
Atchafalaya River.			
Simmesport, La	42.0	42.5	−0.5
Melville, La	38.0	37.7	+0.3

In the next table will be found the dates between which the river was above the flood stage at the various river stations, together with the total number of days. A hydrograph showing the stages from day to day will be found in Chart IX.

Above flood stage.

Station.	From—	To—	No. of days.
Cairo, Ill	January 21	February 5	16
New Madrid, Mo	January 20	February 8	20
Luxora, Ark	January 28	February 7	11
Memphis, Tenn	January 22	February 12	22
Helena, Ark	January 13	February 15	34
Arkansas City, Ark	January 10	February 22	44
Greenville, Miss	January 20	February 19	31
Vicksburg, Miss	January 23	February 23	32
Natchez, Miss	February 1	February 25	25
Baton Rouge, La	February 6	February 27	22
Donaldsonville, La	February 5	February 27	23
New Orleans, La	January 14	March 6	52

The following are the reports in detail of the floods in the various districts:

Cairo, Ill., to Memphis, Tenn., by Mr. S. C. Emery, official in charge of local office, U. S. Weather Bureau, Memphis, Tenn.

During the preceding summer months the Mississippi from below Cairo to Helena was considerably above the usual stage for that season. In October and November the river rose to

greater heights than ever before known in those months, while the maximum stage for the month of December has been exceeded but once during the last thirty-six years.

From November 17 to 21 occurred one of the most remarkable downpours of rain ever known in this section. The rainfall at Memphis during those five days amounted to 14.11 inches, and thruout western Tennessee and northern Mississippi the fall was equally great, and in some localities even greater. The natural effect of this great downpour was the raising of all the local streams to flood heights. The Wolf, Hatchie, and Forked Deer rivers, streams emptying into the Mississippi from the east between Cairo and Memphis, were out of their banks and all the adjacent lowlands were severely inundated. For several days railroad traffic was practically suspended on several lines entering Memphis and on all it was more or less impeded. Many bridges were washt away by the flood and county roads badly damaged. As these waters were suddenly poured into the Mississippi, its rise was unusually rapid, and during the six days following the beginning of the rise at Memphis the river rose 18 feet, an average of 3 feet daily. Under normal conditions an increase of 1 foot in twenty-four hours is considered quite rapid.

The crest of the rise reached Memphis on November 30 and Helena on December 2, with stages of 29.5 and 37.3 feet, respectively.

On December 1 the stage at Memphis was 29.2 feet, but by December 14 it had fallen to 13.5 feet, when a second swell set in which reached its maximum at Memphis on December 27 with a stage of 25.7 feet. Two days later the river came to a stand at Helena with a stage of 34.1 feet. After December 27 the river fell very slowly for six or seven days, and on January 4 the third important rise of the series began to be felt at Memphis. Considering the high condition of the river at the beginning, this rise was very rapid, the increase amounting to 11 feet in eight days. The swollen condition of all streams in this district, taken in connection with the great volume of water then moving down the Ohio and the general rains in progress over the watershed, strongly indicated that bank-full stages would soon prevail in this section. Accordingly on January 9 a special warning bulletin was issued and distributed over the territory most likely to be affected. This bulletin gave notice that flood stages would be reached at all points between New Madrid and Helena within the next ten days, and that the following maximum stages were expected: New Madrid, 35; Memphis, 33, and Helena, 43 feet. The stages actually reached were: New Madrid, 33.9; Memphis, 33.0, and Helena, 43.4 feet.

The crest of this rise reached Memphis on January 14 and from that date until January 17 the river remained stationary at 33 feet (flood stage). During January 18 and 19 a very slight fall occurred, but on the following day the great flood wave, that two days before began pouring its waters into the Mississippi at Cairo was first felt at Memphis, and the river again took an upward turn.

On January 18, two days before the first appearance of the rise at Memphis, a special warning bulletin was issued and a copy sent to every post-office in the territory likely to be affected. This bulletin annouced that—

Owing to the unsettled weather conditions prevailing over the watershed it is impossible at this time to forecast the maximum stages that are likely to occur on the coming rise, but it is highly probable that a stage exceeding 36 feet will be reached at New Madrid and Memphis and above 46 feet at Helena. These stages will be reached in the next ten days.

On January 22 a third special bulletin was issued and extensively distributed by mail, telephone, and telegraph, and given special prominence in the daily papers. This bulletin announced that in the next ten days the stage at Memphis would be between 39 and 40 feet and that the maximum would be close to 40 feet, while a stage exceeding 49 feet was expected at Helena. It also advised all those having interests liable to be affected by an overflow to prepare in season. Ten days after the bulletin was issued the stage at Memphis was 39.8 feet and at Helena the river had risen to 49.3 feet.

On January 25, seven days before the arrival of the flood crest, a warning bulletin was issued as follows:

The Mississippi River will continue rising at New Madrid until next Monday (January 28) and come to a stand at 39 feet or slightly above. At Memphis it will rise until the last of next week (February 1 or 2) and reach a stage of 40 feet, or possibly higher. At Helena a stage of about 50 feet is indicated in the next ten days. At Memphis and Helena the expected increase above the present stage is 6 feet. All persons living or having interests in that part of the St. Francis basin lying west and south of Marion, Ark., are warned that an overflow is possible and should prepare at once for such a contingency.

From January 20 to 25 the rise was not as rapid as many thought it should have been, considering the rapid rise that had been in progress at Cairo during the previous six or seven days and the fact that the crest had about reached that station. This slow rise was a natural result of the overflow waters being deflected to the Reelfoot basin and other low places in the Tennessee bottoms. After all these low places became filled the fact was soon made apparent by a rapid increase in flood levels all along the line. The same difficulty in tracing the movement of flood crests occurred in 1903 and 1904, and until the completion of the levee now under contract that is to run from Hickman, Ky., to the high ground above Tiptonville, the purpose of which is to restrain the water from entering the Reelfoot basin, all future flood waves may be expected to follow a like course.

On January 28 the river at Memphis began rising at the rate of about one foot in twenty-four hours and the bulletin for that day announced that a stage exceeding 40 feet would be reached in the next six days. Whether the levee between Hollybush and Marion would be able to resist four feet more water was considered doubtful, and the situation at this time appeared serious. As this was the only section of levee north of Memphis regarding which there was any serious apprehension, the work of the engineers was concentrated at that place. Several hundred workmen with material and tools were hurried to reinforce the army of men that had been working day and night for several days, and every method known to levee engineering science was brought to bear in the efforts to prevent a break in the levee. Had a break occurred at Hollybush, a strip of country 30 miles wide and 60 or 70 miles long would have been submerged; and among other towns that would have been in the direct path of such a crevasse are Marion, Crawfordsville, Vincent, Edwards, and Earle, besides numerous milling settlements.

On February 1 the river had risen to 40 feet on the gage at Memphis, and during the early morning of that day the recently constructed levee in North Memphis gave way; a considerable portion of that section of the city was under water and many of the manufacturing plants along Wolf River were closed in consequence. The situation at Hollybush at this time was as serious as can be imagined. For days the labor of hundreds of men had been concentrated upon a strip of low, soggy levee about 1000 yards in length, where the water was held in check solely by the use of sacks filled with mud, the only available dirt. The river was then considerably above the crown of the levee, and the whole embankment was so soaked with water that it was in imminent danger of being carried away by the constantly increasing force brought against it. To prevent this a board wall was erected in front of the earth-filled sacks, with braces extending to the rear, a system of defence now extensively used, and as fast as possible fresh sacks were filled and piled along the top and sides. To add to the difficulty, a dense fog spread over the river and continued thruout February 1 and 2, most of the time being so thick that navigation was entirely sus-

pended, and workmen employed on the levee were fast deserting on account of the threatened danger. On February 3, however, a sudden change to colder weather hardened the surface of the wet earth, decreasing the danger from wave-wash, the sky cleared, and the river came to a stand at 40.3 feet, the highest stage on record.

The area flooded during the present rise was somewhat less in extent than in 1903, and owing to the fact that it occurred during the winter season the damage to crops and farm products was not as great as would have been the case had it occurred a month or two later. Being warned in ample time, all occupants of the lowlands subject to overflow were able to remove their property to places of safety and otherwise prepare for the coming flood. Most of the island plantations were submerged, and as usual in time of flood the stock and negro help were gathered upon mounds prepared for just such emergencies. On the east, the Tennessee bottoms and lands adjacent to the numerous small tributary streams were more or less flooded, but not as extensively as in 1903. For a time the Yazoo and Mississippi Valley Railroad tracks south of Memphis for several miles were lying in about 30 inches of water, which caused a partial suspension of traffic. On the west bank of the Mississippi the flooded area embraced only the lands lying outside the levee, the remaining portion of the St. Francis basin being saved from overflow by the protecting levee.

During the progress of the flood this office was at times overwhelmed with inquiries by telephone and telegraph from people in the city, as well as those living at far distant points. Extra copies of the daily river bulletin were printed for distribution by passing boats to river towns and settlements, and about 300 post-offices were supplied with each special bulletin issued. River forecasts were sent daily over the wires of the Iron Mountain and the Frisco railroads, as well as those of all telephone companies operating in eastern Arkansas.

While the stage at Memphis exceeded in height all previous records, the actual volume of water was much less than in either 1897 or 1903, and probably no greater than in 1904, when the maximum stage at Memphis was only 39 feet. In 1903 the river was above flood stage at Memphis fifty-four days against twenty-two days in 1907, and, as shown in the following table, the crest stages at all stations in the district except Memphis were higher in that year than during the recent rise:

Year.	Cairo.	New Madrid.	Fulton.	Memphis.	Helena.
1903	**50.6**	**39.5** −11.1	**40.1** −10.5	**40.1** −10.5	**51.0** +0.4
1907	**50.3**	**39.3** −11.0	**38.4** −11.9	**40.3** −10.0	**50.4** +0.1
	− 0.3	− 0.2	− 1.7	+ 0.2	− 0.6

Heavy-faced figures in the table, following those indicating the maximum stages, are the gage relations referred to Cairo. It will be seen that in 1903 the difference between Cairo and Fulton was 10.5 feet against 11.9 feet in 1907, showing an increased difference, or in other words there was a depression of 1.4 feet in the flood wave at Fulton where the maximum was 1.7 feet higher in 1903 than in 1907. At Memphis these conditions were reversed, the difference compared to Cairo being 0.5 foot less in 1907, and the maximum stage 0.2 foot above 1903. In 1903 there were two crevasses in the Arkansas levee, one at Hollybush and the other at Random Shot. The water that escaped thru these two breaks was sufficient to severely flood the lower half of the St. Francis basin, comprising several counties, and it is believed the flood plane at Memphis was thereby lowered at least 1.0 foot and possibly 1.5 feet. Again, in 1907 the flood wave was remarkably short considering its height, and as a very rapid decline immediately followed the passing of the crest, the latter was not as sustained as it would have been with a wave less abrupt. As a result the crest had a tendency to flatten or become deprest. The maximum stage at Cairo in 1907 was only 0.3 foot below that of 1903, while at Fulton it was 1.7 feet below, clearly indicating the depression in the flood wave at Fulton of 1.4 feet, before mentioned. This depression in the flood wave, due to the rapid decline after the passing of its crest, is shown to be more and more pronounced as the distance from its source increased, being especially noticeable at points below Helena. This being the case, and assuming that the crest depression at Memphis was about equal to that shown at Fulton, it follows that if we apply a correction to the 1903 record to cover the loss occasioned by crevasses, the gage relation between Fulton and Memphis is reestablished and the fact shown that the river was higher in 1903 than during the last rise.

Memphis, Tenn., to Vicksburg, Miss., by Mr. W. S. Belden, official in charge of the local office, U. S. Weather Bureau, Vicksburg, Miss.

The flood of January and February, 1907, was the first of its magnitude to pass from Cairo to below New Orleans without a break in the levees between these two places, and it was attended with higher stages thruout this district than were ever before recorded at this season of the year. The lower Mississippi River was remarkably high in November and December, and this condition, in connection with the two rises that culminated at Cairo in January, were the prime factors that produced the flood.

The stage at Vicksburg on January 4 was 36.2 feet. On that date a stage of 42 feet was forecast for this place, to be reached by the middle of January. On the morning of January 16 the stage was exactly 42 feet. Warning to prepare for a stage of at least 44 feet at Vicksburg was issued on January 8, two days before the first of the two rises reached Cairo. This warning was fully justified. Subsequent warnings for higher stages were issued from time to time while the second rise was in progress at Cairo. Early in February final crest stages as follows were forecast: Arkansas City, slightly more than 52, Greenville, 47.5, and Vicksburg close to 50 feet, the latter to be reached about the middle of February. The crest stages, with dates of occurrence, were as follows: Arkansas City, 52.1, or 10.1 above flood stage, February 8; Greenville, 47.3, or 5.3 above flood stage, February 8 and 9; and Vicksburg, 49.7, or 4.7 above flood stage, February 11. The water remained nearly stationary at Vicksburg from February 11 to 14. Fifteen days were required for the passage of the flood crest from Cairo to Vicksburg, and the water was above flood stage for forty-four days at Arkansas City, thirty-one days at Greenville, and thirty-two days at Vicksburg.

As a result of warnings issued by the Bureau, preparations for the high water were well under way before the flood stage was reached in the upper portion of the district. Between the river and the levees there was considerable cotton to be picked, and this work was rushed with excellent results. Planters secured necessary permission from insurance companies to run gins night and day, and large forces of pickers were placed in the fields. With the exception of a few rainy days the weather was generally favorable thruout the high-water period. Practically all cotton not protected by levees was picked, ginned, and shipped before the rising water forced a cessation of farming operations. Losses caused by the flood were almost wholly due to expense incurred in preparing for it and were mostly confined to the southern portion of the district. The southern portions of Issaquena, Sharkey, and Yazoo counties, and portions of Warren County, were overflowed by back water in the Yazoo River that extended up nearly to Yazoo City, where the maximum stage was 26.1 feet, or 1.1 feet above flood stage, on February 14. In this over-

flowed area the greater portion of the stock was kept on mounds, some of which have been built recently and can be utilized with a stage as high as 53 or 54 feet on the Vicksburg gage. Several of these mounds are near the mouth of the Sunflower River, which empties into the Yazoo River about midway between Vicksburg and Yazoo City. Where mounds were not available stock was moved well in advance of the rising water. By far the greater portion of the stock was moved before the water reached 46 feet on the Vicksburg gage. A total of about 2000 horses, mules, and cattle were taken by boat to Vicksburg, or to other places of safety. Davis Island, which is a part of Warren County, Mississippi, about 25 miles below Vicksburg, has a private levee approximately 14 miles in circumference. This levee can withstand between 48 and 49 feet on the Vicksburg gage. In the flood of 1903 it withstood the water when the stage was about 51 feet at Vicksburg, but a cut-off made by the river immediately above the island in April, 1904, had the effect of diminishing the efficiency of the levee. The island has a normal population of about 900 inhabitants, mostly negroes, who are employed on the few large plantations. Here not all the cotton crop was secured. It was estimated that 150 bales remained in the fields unpicked when the private levee broke on the upper side of the island on January 31. Thruout the overflow period a few people remained on the island and some stock was kept on mounds. But as a rule both the negro tenants and movable property were transferred to places of safety. Preparations to evacuate the island were made and some moving was done before the levee broke.

In Vicksburg about 12,000 bales of cotton were moved from a compress adjoining the Yazoo Canal, that was not protected by levees. This compress was overflowed when the water reached a stage of slightly more than 48 feet. As a matter of precaution, some cotton was also moved from a neighboring compress protected by a levee. Some cotton was shipped direct to the mills, but most of it was placed on vacant lots and along the sides of many streets thruout the city, which is about 200 feet higher than the river. Proprietors of warehouses on Levee street moved their goods from basements, but in only one instance did the water reach the first floor.

During the high-water period 500 river bulletins were disseminated thruout the district daily, except Sundays, and special bulletins were prepared Sundays and posted in conspicuous places in Vicksburg. At about 9 a. m. the river and weather information was telephoned to the State Levee Engineers at Greenville, Miss., and Lake Providence and Talullah, La. This information was of material assistance to the engineers and was much appreciated by them. In this connection Mr. E. J. Hamley, in charge of the State Levee Board office at Lake Providence, wrote as follows:

> We fully appreciate all that you have done for us in the way of keeping us posted in regard to high-water conditions, in which we are so vitally interested, and wish to take this opportunity to thank you for your promptness in all matters pertaining to your office.

The levees were patrolled during the time the water was high against the embankments, and men and material, with boats for transporting the same, were held in readiness to respond to emergency calls.

In regard to the levees the following information was furnished by Mr. M. P. Robertson, assistant state engineer of Louisiana, and Mr. C. H. West, chief engineer of the Mississippi Levee Board:

> The entire line of levees on the west side of the Mississippi from the Arkansas River southward to Delta, La. (opposite Vicksburg), has been enlarged and improved to a grade of not less than two feet above the highest water of record. The levees thruout the entire length of this stretch are much better cared for than in the past. There are no weedy levees, none previously wave-washed.
>
> The line of levees on the east side of the river from opposite Helena, Ark., to just above Vicksburg has been materially increased both in height and volume since the flood of 1903. That portion of the levee line most deficient in height and cross section is below Greenville, but the contracts now in force will very materially improve the condition along that portion of the line. A considerable portion of the levee above and all below Greenville will still have to be materially increased in height and volume of the embankment in order to give security against floods of the first magnitude.

Thru cooperation with the United States engineers the river gage readings made at Lake Providence, La., were telephoned to the Vicksburg office during the critical period and were published in the daily river bulletin.

The maximum stage attained at Lake Providence was 46.3 feet on February 9 and 10. The highest previous stage was 46.5 feet on March 27, 1903. The fact that the water was comparatively much higher at Lake Providence than at either Greenville or Vicksburg is due to the retention of the water between the levees. In 1897 and 1903 the levees on the Mississippi side broke above Lake Providence and allowed large volumes of water that had past the Greenville gage to flow out of the river. This water was again returned to the Mississippi at Vicksburg, hence also past the Vicksburg gage, but it escaped the Lake Providence gage.

The time the water past below flood stage at Arkansas City, in the upper portion of the district, was correctly forecast one week in advance, and at Vicksburg, in the lower portion, six days in advance. This time marked the beginning of the return of people and property to plantations that had been overflowed.

Vicksburg to the mouth of the river and the Atchafalaya River, by Mr. I. M. Cline, official in charge of the local office of the U. S. Weather Bureau, New Orleans, La.

The flood in the lower Mississippi River during January and February, 1907, is the earliest flood of record in this section, and in magnitude second only to that of March and April, 1903. The conditions which caused this flood, giving the second highest water of record, were materially different from those which obtained in connection with the flood of 1903. All of the flood waters in the present instance came from above Memphis, while in 1903 all the rivers below Memphis were carrying large volumes of water, which augmented the flood waters which came from the upper rivers as they reached the lower Mississippi. During the flood of 1903 the Atchafalaya River was taxed with flood waters from the Red and Ouachita rivers, but in 1907 the Red and the Ouachita were at low stages and the Atchafalaya served as a discharge for a large volume of flood waters from the lower Mississippi. The Bayou Lafourche, which during previous floods served as an outlet and carried a considerable volume of flood water to the Gulf, has been closed since the flood of 1903, and this is a matter which must now be taken into consideration, as the water that was carried off thru that channel must now reach the Gulf by way of New Orleans.

Flood warnings were issued on January 11 for stages of 17 feet at New Orleans, and 34 feet at Simmesport and Melville, La., on the Atchafalaya River, by January 21. On January 21 the stage at New Orleans was 16.7; at Simmesport, 34.5, and at Melville, 33.3 feet. The second warning was issued on January 15, when a stage of 18 feet was forecast for New Orleans by January 25. A stage of 17.5 feet was recorded on that date. On January 24 warnings were issued, which stated that stages between 45 and 46 feet would be reached at Natchez, 34 and 35 feet at Baton Rouge, 18 and 19 feet at New Orleans, 36 and 37 feet at Simmesport, and 34 and 35 feet at Melville by February 2. The following stages were recorded on that date: Natchez, 46.3; Baton Rouge, 34.1; New Orleans, 18.4; Simmesport, 37.9, and Melville, 35.4 feet. On January 29 warnings were issued for stages of 48 feet at Natchez, 35 feet at Baton Rouge, 19 feet at New Orleans, 37 feet at Simmesport, and 35 feet at Melville by February 8. At New Orleans the stage of 19 feet was reached on February 8, and the stages

forecast for other stations were reached by the dates named. On February 1 conditions appeared to be sufficiently well-defined to warrant a forecast of final stages, which was deemed necessary in the interests of the public, to enable them to properly cope with the situation, and the following warning was issued:

The Mississippi River at New Orleans will continue to rise slowly, and if the levees hold and brisk southerly winds should prevail during the passage of the flood crest, preparations should be made for a stage of about 20 feet at New Orleans and 36 feet at Baton Rouge between February 15 and 25, and 49.5 feet at Natchez by February 18.

Warnings for final stages on the Atchafalaya of 42 feet at Simmesport and 38 feet at Melville, and on the Mississippi of 37 to 38 feet at Baton Rouge were issued later. The crest of the flood past Natchez on February 14, with a stage of 48.9 feet from February 12 to 14, inclusive; New Orleans on February 21, with a stage of 19.8 feet from February 13 to 21, inclusive, except that stages of 19.7 feet were recorded on February 18 and 20 as a result of winds; Baton Rouge on February 19, with a stage of 37.3 feet from February 14 to 19, inclusive; Simmesport on February 22, with a stage of 42.2 feet; and Melville on February 19 and 20, with a stage of 37.7 feet.

The warnings were given the widest possible distribution. Prompt action was taken to repair and strengthen levees. Where the levees in front of New Orleans were not above the high water of 1903, emergency levees were constructed. One such levee was constructed at the foot of Canal street, four blocks from the local office of the Weather Bureau, and but for this levee the water would have run into the city over an area several blocks wide. The water stood for several days against the emergency levee. The fact that the levees above New Orleans .stood the strain of the high water without a break may in a great measure be attributed to the extra care and precautions taken as a result of the warnings of the Weather Bureau.

A break in the right bank of the levee at Jesuits Bend, 25 miles below New Orleans, occurred about 10 p. m. on the night of February 21. Material and laborers were promptly rushed to that point and efforts were made to close the crevasse, but without success. The river fell slowly after February 21 until a stage of 15.1 feet was reached March 10, after which a second rise commenced. When the river had fallen to a stage of 16 feet at New Orleans on March 5, the work of closing the crevasse was resumed vigorously with a view to completing the work before another rise, which was in sight, should set in. The crevasse was then 200 feet wide. The break was apparently successfully closed on March 16. Several sugar plantations, truck farms, and orange groves were flooded. The flood waters from the crevasse overflowed all the arable land on the right bank of the river below Algiers, La., and the damage resulting from the overflow will amount to several hundred thousand dollars.

The public was greatly pleased with the warnings issued by the Bureau, and the Times-Democrat, New Orleans, La., February 9, 1907, said:

The river reached 19 feet here yesterday, as forecast by the United States Weather Bureau eleven days ago. The forecasts have been exceptionally accurate, both as to the expected stages and the time of their occurrence.

There was a moderate freshet in the lower Tennessee River during the first few days of the month, due to the heavy and general rains of January 31 and February 1 over the Southern States. Warnings were issued for a stage of between 22 and 23 feet at Johnsonville, Tenn., flood stage being at 21 feet, and at 8 a. m., February 5, the stage of the river was 22.5 feet. The warnings were of much value to farmers and the lumber interests.

The same general rains caused decided rises in all the rivers of the Gulf of Mexico system east of the Mississippi River, but as a rule not to flood stages except in the Black Warrior and lower Tombigbee rivers. Warnings were promptly issued whenever necessary and there was no damage of consequence. As a matter of fact the floods were of much benefit to the lumber interests as the high water permitted the free movement of lumber that had been cut for the market.

About the time the Mississippi River flood was at its height, there was in progress another great flood thruout the Willamette Valley. It was caused by the heavy rains that fell over the north Pacific coast from February 1 to 6, inclusive, and was the greatest winter flood since that of 1890. While the waters rose to heights from 7 to 11 feet above the flood stages, no great amount of damage was done. The largest single loss was probably that of the boathouse of the Portland Rowing Club, valued at about $10,000. A considerable quantity of logs, lumber, and fencing was carried down the various streams, but the loss was comparatively small. The flood warnings were issued first on February 4 and frequently thereafter until the waters had receded below the flood stages. The following item from the Portland Oregon Journal of February 9, 1907, relative to the flood warnings will be of interest:

Merchants having goods stored along the water front saved thousands of dollars by the splendid reports and warnings issued by the Weather Bureau. Relying upon the efficiency of the service, they did not go to the expense of removing goods from localities which the water would have reached had it risen a few inches more. Forecaster Beals estimated the rise to an inch nearly 48 hours in advance, and many merchants staked thousands of dollars' worth of goods on the correctness of his estimate. They are now complimenting the service.

The following brief account of the flood was prepared by Mr. E. A. Beals, district forecaster in charge of the Portland, Oreg., Forecast District.

Between February 1 and 6, 1907, heavy rains fell in the basin of the Willamette River, and as they were followed by moderate temperatures and had been preceded by sufficient rain to thoroly saturate the soil, they caused the highest winter flood in the Willamette River since February, 1890. Fig. 1 shows the amount and distribution of the precipitation that caused the flood, and fig. 2 hydrographs for four stations on the main stream.

Warnings for this flood were first issued on Monday, February 4, when stages of 15 feet Tuesday and 17 feet Thursday were forecast for Portland, 23.5 feet Wednesday for Salem, and 25 feet Tuesday for Albany. These first estimates were somewhat too low and the next morning they were raised, as follows: Portland to 21 feet by Friday, Salem to 30 feet in thirty-six hours and Albany to 30 feet in thirty hours. The next morning, which was Wednesday, February 6, the estimate for Portland was raised one foot, but no changes were made in those for Salem and Albany. The crest past Albany at noon on February 6, at a stage of 30.8 feet, or 0.8 foot higher than the stage forecast, and Salem at 6 p. m. the same day at a stage of 31.3 feet, or 1.3 feet higher than forecast. The next morning the stage expected at Portland was raised 0.5 foot, or 22.5 feet, and this was the exact stage reached at midnight February 7–8, sixteen hours after the forecast was made.

Owing to the accuracy and timeliness of the warnings the losses were very small and consisted principally of the loss of saw logs and houseboats which broke away from their fastenings and drifted down stream. The houseboats were mostly recovered, tho in a damaged condition, but the logs were a total loss. The wharves on the river are built with upper and lower docks, the latter being used during low water and the former during floods. Large quantities of merchandise had accumulated on the lower docks which had to be moved to the upper ones. Altho there were thousands of tons of goods in the cellars and on the lower docks which had to be moved during this flood, the only losses so far as learned consisted of about five hundred dollars' worth of baled hay which was caught during the second day of the flood. This hay was not

a total loss, as much of it was saved and afterwards dried so as to be used.

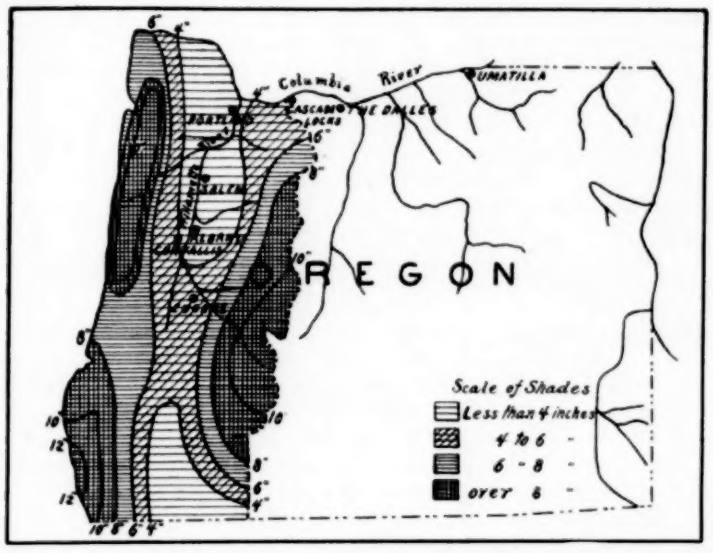


FIG. 1.—Precipitation in western Oregon from February 1 to 6, 1907, inclusive.

The same general rains also caused flood stages thruout the upper Sacramento Valley, but nothing of a serious nature developed.

The Missouri River opened at Omaha, Nebr., on the 18th, but remained generally frozen above. There were ice gorges at times above Sioux City, Iowa, especially from Vermillion, S. Dak., southward, and about 100 square miles of farm lands were inundated. There was no change in the upper Mississippi River, and it remained frozen as far south as Leclaire, Iowa. The upper Allegheny River was frozen during the greater portion of the month, as were also portions of the Scioto and Sandusky rivers of Ohio. The rivers of New England and the Middle Atlantic States continued closed thruout the month.

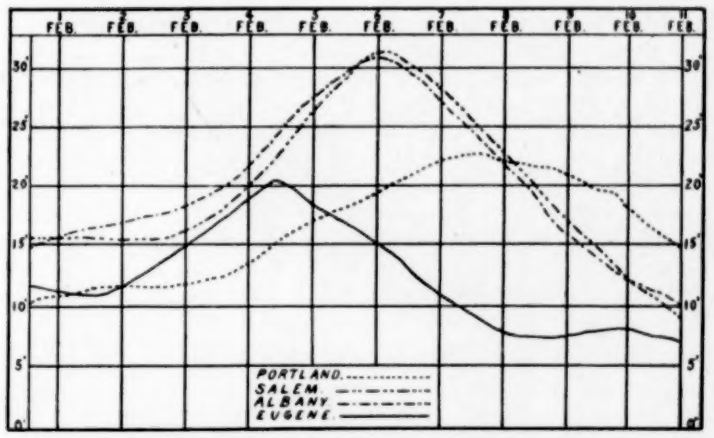


FIG. 2.—Hydrographs for four stations on the Willamette River, February 1 to 11, 1907.

There was considerable ice in the Columbia River about the time of the Willamette flood, and navigation was greatly interrupted, and at times suspended.

The highest and lowest water, mean stage, and monthly range at 300 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississipi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

NORTH ATLANTIC WEATHER.

By Mr. JAMES PAGE, Chief of the Division of Ocean Meteorology.

[Compiled from the daily observations, at Greenwich mean noon, furnished by cooperating observers at sea.]

The Greenwich mean noon synoptic weather chart for February 1 shows two well-defined areas of high pressure covering the eastern half and the western half of the ocean, respectively; the former central in latitude 50° north, longitude 15° west, and exhibiting maximum barometric readings of 30.60 inches; the latter central over the Gulf of St. Lawrence, with maximum pressure of about the same intensity. The axis of the trough of low pressure separating these two highs extended from the parallel of 50° to the parallel of 34°, in an almost due north and south direction along the meridian of 37° west. On the eastern slope of this trough southerly gales of force 8 and 9 prevailed, the belt of high winds extending in width eastward to the meridian of 29° west. On the western slope, northerly and northwesterly gales extended as far as 50° west. The shift of the winds experienced by westward bound vessels crossing the line of minimum pressure was in all cases almost instantaneous.

Thruout the day this distribution moved slightly to the eastward, its principal features remaining intact. At Greenwich mean noon of February 2 the trough of low pressure was roughly coincident with the meridian of 28° west. In the rear of the American high, pressure gave way rapidly, a wedge-shaped prolongation of a cyclonic area central over the Great Lakes suddenly extending eastward across the New England coast, giving rise to southeasterly gales along the transatlantic routes as far eastward as longitude 55°. Thruout February 3 and 4 this cyclonic area was stationary over the Gulf of St. Lawrence and Newfoundland. During February 5 pressure in this region underwent a marked increase, coincident with the appearance of a decided local depression off the coast of New Jersey. The latter, altho accompanied by cyclonic winds of force 10 and 11, was of brief duration, no evidence of its existence being apparent upon the chart of February 6.

Moderate weather prevailed over the entire ocean February 7 and 8.

On February 9 a marked area of low pressure developed to the northward of Bermuda, and moving eastward gave rise to the most severe storm experienced during the month. On the 10th the position of the center (minimum pressure 28.90 inches) was latitude 43° north, longitude 52° west, the center being surrounded by a completely developed system of cyclonic winds of full hurricane force. The course of the depression was about east-northeast; it was attended thruout by violent gales in its southern and western quadrants, and finally crost the British Isles February 12.

Moderate weather was continuous from February 14 to 22, the salient feature of the pressure distribution thruout this interval being a strengthening of the high over the Azores, the pressure thereabouts ranging from 30.40 to 30.60 inches. Thruout the same period Newfoundland was covered by the characteristic low area, and on several days the gradients became of sufficient steepness to occasion winds of gale force thruout the intervening region, the area affected being in general limited by the parallels 40°–45° north, and the meridians 40°–55° west.

On the 18th of the month pressure over Iceland fell below 28.60 inches, accompanied by hurricane winds along the

steamship route north about Scotland. On the date named the British steamship *Lucerna*, Tyne to Philadelphia, latitude 58° 30′ north, longitude 14° 30′ west, reported a barometric reading of 28.09 inches, attended by a hurricane from the west and terrific seas. On the 19th and 20th these westerly gales swept the coast of Ireland and extended over the United Kingdom. Pressure over the Azores gave way February 22, and remained below the average until February 27. Thruout this interval, as usual, a well-marked anticyclonic area covered the British Isles, extending westward to the mid-Atlantic. Pressure over the American coast was high February 23 and 24, which, coupled with the low to the eastward, occasioned fresh north and north-northeasterly gales along the New York–West Indian route. On the 25th a decided diminution occurred, the barometer at Quebec falling from 30.72 inches to 29.66 inches in twenty-four hours. The winds over the ocean to the westward of 60° underwent a corresponding shift from north and northeast to south and southwest. The center of the low moved rapidly eastward, and on the 26th westerly gales covered the transatlantic routes from Sable Island to 45° west, extending as far southward as the thirty-fifth parallel. The system then moved northward, and these gales were not felt east of the thirty-fifth meridian. February 28 showed a resumption of anticyclonic conditions over the American coast, with resulting strong northwesterly winds thruout the region to the southward of Newfoundland.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

NOTES OF A METEOROLOGIST IN EUROPE.

By H. J. COX, Professor of Meteorology. Dated Chicago, Ill., March 22, 1907.

An account of my trip abroad, in which I visited several of the meteorological offices in Europe, may be interesting to readers of the REVIEW, and, at the request of the Editor, I have prepared a summary. I have also included in the report my impressions of the weather experienced on the trip.

Whether traveling on business or pleasure, a "weather man" finds it difficult to entirely separate himself from his profession, and so it was with me on my voyage across the Atlantic. While on the ocean, I followed the readings of the barometer from day to day, noted the condition of the weather, the effect of the wind upon the sea, and indirectly upon the large ship on which I was sailing.

It had been my impression that on an eastward voyage storms were less likely than when bound westward; and that, if one left the American side in a period of fair weather, he was likely to have settled conditions all the way across; assuming, of course, that the storms move across the ocean with the same general direction and velocity as the ship. Yet during my passage of seven days storms occurred in rapid succession. The ship left New York on the morning of December 1, 1906, with partly cloudy weather and nearly normal barometer prevailing. During the next forty-eight hours the barometer fell steadily, reaching a minimum of 29.53 inches on the morning of December 3. High winds and rain prevailed on both the 2d and 3d, the rain on the 3d turning to snowsqualls, with winds shifting from southerly to northwest and followed by rising barometer and fair weather in the afternoon. The ship's weather report noted the conditions as "fresh gale and tempestuous sea". December 4 was again showery, with increasing winds from the east, and falling barometer. The ship's report again noted the conditions as "fresh gale and tempestuous sea". December 5 was showery with rising barometer and high northwest winds. The ship's report stated "moderate gale, rough sea". The barometer rose rapidly during the night of the 5-6th, reaching a maximum of 30.5 inches. Fresh southeast winds prevailed with cloudy weather and smooth sea during December 6. On the following day, December 7, the barometer, altho high, began to fall and showers prevailed. It became clear in the evening, however, and Daunt Rock Light, on the southwest coast of Ireland, was plainly visible late at night, the first indication of approaching land. When we reached the Cove of Cork, Queenstown Harbor, at 3 o'clock in the morning of December 8, and lay to for an hour in order to land some passengers and mail, it was dark and gloomy, and the faint outlines of the shores of Ireland, about half a mile distant, could barely be discerned. Later in the day during our passage northeastward to Liverpool thru St. Georges Channel and the Irish Sea, variable winds prevailed, and a partly overcast sky. The shore of Ireland could at no time be seen very clearly, but the mountains of Wales in the afternoon loomed up with great distinctness on the right. It was dark when we reached the Mersey, and raining hard by the time the train for London pulled out of the Liverpool station at 8 p. m., but on my arrival in London at midnight the sky was entirely clear. A pleasant surprise awaited me in the shape of good weather in London during a stay of three and one-half days. The first two days were clear and cold with a minimum temperature below the freezing point; while on the third day—December 11—there was increasing haze, smoke, and fog, and by the afternoon the atmosphere was quite thick, objects being distinguishable but a short distance. It was, in fact, the well-known London fog, but in very weak form. Londoners told me it was "a mere nothing" as compared with what they often have. I was naturally interested in this condition, and desired to draw some comparison between it and the smoky weather which often prevails in Chicago, but there did not seem to be much similarity between the conditions. The atmosphere had a peculiar yellowish color, the haze or fog being apparently quite general, and it was so dense at 3 p. m., when I stood on London Bridge, that I could not see the Tower, about 600 feet distant. On the night of December 11 heavy rain set in, but by the following morning it was quite clear again.

I had a very pleasant visit to the meteorological office on Victoria street on December 10, meeting Dr. W. N. Shaw, the director, and several members of his scientific staff. The observatory in London is in St. James Park, there being no meteorological station at the central bureau. I learned from Doctor Shaw that the service is not considered distinctly governmental, as it receives its support by what is called the *Grant in Aid*. It is true, however, that it has no other funds at its disposal, except a few hundred pounds per year which it receives from the sale of the forecasts and weather maps. The price of the telegraphic forecast is one shilling and the cost of transmission. The price of the weather map is one pound per annum or one penny per day. Public and educational institutions are provided with these free of expense, as well as the newspapers, but the latter are required to send by messenger for the forecasts each morning, and the forecasts are not telephoned to anyone. The night forecast is published in the morning papers for the ensuing day. The meteorological service of Great Britain is not able to secure precedence of its messages over the telegraph wires, the post-office department refusing to recognize it as other than a private service. In fact, the director states that if a message containing a bet on a horse race were filed at the same time or even a little later than a storm-warning message the former would be likely to be sent first. This want of recognition hampers the service considerably, but the British boast that they are exceedingly democratic, and they feel that no precedence should be granted by the government telegraph lines except to messages solely concerning the affairs of state.

The observations are taken at 8 a. m., Greenwich time, in the British Isles and in France, and at 7 a. m. in other conti-

nental countries. They are received by special message in London in the forecast room, there being no working circuits such as we have in this country. The reports arrive very slowly, and those from eastern Europe and Spain are usually very late, sometimes not being received until the following day. There is also delay in translating from the centigrade and metric systems into Fahrenheit and English measures, as the scale on the continent is different from that used in England. The forecasts are issued about 10 a. m. Additional observations are taken at 2 p. m. in the British Isles, while 7 p. m. observations are taken generally all over Europe, but they are not telegraphed until the following day with the morning observations, being at hand for the use of the forecaster, in the shape of a supplementary map to his regular working morning chart. On the latter chart are entered practically all the current conditions, there being no additional charts of pressure and temperature, as are used in the United States.

There are four publications issued each morning: (1) Daily weather report, corresponding to our tabulated bulletin, showing the weather at various stations of Europe in tabulated form; (2) remarks on the weather, corresponding to our synopses; (3) general inferences, from the 8 a. m. observations, and the forecasts for the twenty-four hours ending the following noon for the various districts in the British Isles, corresponding to our general forecasts and forecasts for States; and (4) a four-page publication, including in its first page the "general situation" at 8 a. m. and the forecasts, duplicating Nos. (2) and (3) above; on the second page three tabulated bulletins, giving miscellaneous data thruout Europe and northern Africa for the previous day; on the third page, the daily weather report included in No. (1); and on the fourth page, five charts, the first being barometer, wind, and sea; the second, temperature and weather, both of the current day; the third, barometer and wind for the previous morning; the fourth, sunshine data for the year; and the fifth, temperature data for the month. Weather maps and forecasts are not issued from any other station in the British Isles. The total appropriation is about £35,000 sterling. Outside of a few stations, the observers in Great Britain are not paid, the stations being mostly maintained by universities and municipalities, and later I found that this custom prevailed largely on the Continent of Europe.

The reports of local observations in London are based upon readings made in St. James Park, the place previously referred to. Thru lack of time I was not able to visit the observatory in London, choosing instead to go to Kew, the visit to which is referred to later. I inquired, however, regarding the equipment in St. James Park and learned that it included a set of maximum and minimum thermometers exposed over the sod "in the open". I have always been much imprest with the publication of minimum and maximum temperature readings thus exposed, the minimum, of course, being of special interest in the winter and the maximum in summer. The latter reading indicates approximately the degree of heat that a person feels when exposed to the sun, and it is a matter of general interest, even tho the observation is not necessarily entirely correct. Even the dispatches which are sent during the heated spells from London to America usually include the so-called "sun temperature" as well as the "shade temperature". On December 10 the minimum temperature at London in the shelter was 31°, it being the coldest day since January 1, 1906. The minimum temperature exposed on the grass recorded 19°. In the language of the Daily Mail, the thermometer recorded "1° of frost" and "13° of frost", respectively.

The officials at the British Meteorological Office gave me a most cordial reception, and seemed pleased to learn all about the practical side of the American meteorological service. While my visit was mainly for the purpose of securing information, Doctor Shaw and his assistants seemed equally desirous of learning what I had to say. Of course, they knew much about our service and accorded it the highest praise. It so happened that arrangements had just been made at the time of my visit to secure a telegraphic weather report from Iceland each morning, and it was on December 9, I believe, that the daily transfer of this report to Washington was begun by Doctor Shaw.

My visit to Kew Observatory on December 11 will long be remembered. I went out from Trafalgar Square by the "underground" to Kew Bridge; thence taking a tram to Richmond, passing en route by the Kew Botanical Gardens. It is necessary to walk some distance from the electric road thru the Mid-Surrey Golf Club grounds in order to reach the observatory, the entire distance from London being about nine miles. Its proper designation is the Kew Physical Laboratory. It is situated in a three-story frame building facing the north in the midst of Old Richmond Park. Obelisks located on the north and south sides of the building indicate the true north and south points. It was built by George III for the observation of the transit of Venus in 1769, and was then called the "King's Observatory." In 1842 it was handed over to the British Association, and in 1871 it was transferred to the Royal Society; it depends for its support upon contributions received from the latter society and the British meteorological service, and upon the fees received for the comparison of instruments and glasses. It is the oldest meteorological observatory in Great Britain; and while it is chiefly known to Americans as a meteorological observatory, and especially for the testing of thermometers and barometers, this is only a small part of its work. The greater portion of the staff is engaged in testing various other kinds of scientific instruments, such as telescopes, binoculars, and sextants. The testing, however, of electrometers, thermometers, and barometers is carried on as heretofore. Instruments tested at Kew have been sent out over the entire world. A meteorological station is, of course, maintained at the observatory, but its reports are not telegraphed to the British Meteorological Office, its proximity to London not justifying the expense. Kew has supervision, however, of the inspection of the meteorological stations in the British Isles, sending its men, when necessary, to visit the stations and properly care for the instrumental equipments. It is chiefly on this account that it receives a considerable portion of its financial support from the Meteorological Bureau.

The instrumental equipment at Kew is quite complete, and I was much imprest with the work of the Dines pressure tube anemometer, the record being highly satisfactory and indicating the force of every gust of wind. Such an instrument has been in use at the Central Office at Washington, I have been informed, but on account of recent changes it is temporarily out of service. A photographically recording wet and dry-bulb psychrometer affords a continuous record of relative humidity. If it were equipped with a fanning apparatus for facilitating evaporation it would be more effective. The bulbs of the thermometers are located in a shelter outside of, but attached to the building, while the record sheet is immediately inside. The electrometer at Kew is the oldest in the world and is the father of all instruments of that character, it, of course, being the standard. The Robinson anemometers in use at Kew and at other places that I visited in Europe were at least twice as large as the anemometers used in America. Exposed in the ground outside are two soil thermometers at depths of 1 and 6 feet, respectively, inclosed in an iron tube, the thermometers having been in the same position, I understand, for a period of nearly half a century. The rain gages have a sod exposure, and the sunshine recorder is a solid glass ball similar to that in use in other portions of Europe. Dr. C. H. Chree is the director of the Kew Observatory, and Mr. Constable is the meteorologist.

I left London on the morning of December 12 for Paris by the Newhaven-Dieppe route. While the weather was quite pleasant, before reaching Newhaven the barometer was falling rapidly, and in the afternoon had reached a minimum of about 29.50 inches, my anticipation that I would have a rough Channel passage being fulfilled. A strong southwest gale blew right across the Channel, and while the sea was probably not any more tempestuous than what I experienced in crossing the ocean, it seemed far more pronounced because of the small size of the Channel boat as compared with that of the large ocean liner. It seemed at times as if the boat would turn almost upside down; and, while I did not become seasick, there were only a few passengers that successfully withstood the ordeal. It was, in fact, a great relief to all when the harbor of Dieppe on the French coast was reached. Storm signals had been hoisted both on the English and French coasts. It was raining heavily upon our arrival at Dieppe at about 4 p. m., but by the time Paris was reached at 7 p. m. the sky had become clear and the barometer was rising steadily.

I visited the central office of the French service, called the Bureau Central Metéorologique, on December 14. It is situated at Rue de l'Université 176, about 1000 feet from the Eiffel Tower. Dr. A. Angot was at that time acting director, and he has since succeeded to the position of director, relieving his father-in-law, Professor Mascart, on January 1. Doctor Angot was most kind in imparting information to me about his service. I was, of course, especially interested in the forecast feature and the instrumental equipment. The reports from Europe are received in the Paris office much the same as in London; and as the meteorological service can secure use of the telegraph wires only in the morning no night forecasts whatever are given out. There is often delay in receiving the telegrams and there is seldom more than one report received daily from Spain. The director exprest his regret at being unable to secure reports promptly from the Spanish Peninsula, as they would naturally be of great assistance to his service in forecast work. The forecasts, when forwarded each morning over the wires, are given precedence over all other business, and it is my impression that they are issued from Paris for the entire Republic.

There is some similarity between the various meteorological publications of the countries of Europe; and the daily weather map and bulletin printed by the French service is not much unlike the British publication, especially as regards the features of the tabulated bulletin. The French publication has, however, two maps—one showing the barometric pressure and its variations, together with the state of the weather, while the second shows the existing temperatures and changes during the past twenty-four hours. There is also a smaller chart issued in connection with the general summary of atmospheric conditions—a one-page publication. Twelve hundred weather maps are published daily, 125 of these being reserved for the use of the meteorological office. The maps are printed outside the office, and the balance are sent directly to subscribers thru the mail. There is no map issued in any other French city outside of Paris, and the observatories are maintained mainly by universities and municipalities. There is an additional observatory maintained in Paris itself by the municipality—the Tour Saint Jacques—it is not, however, under the jurisdiction of the Meteorological Bureau. Many of the instruments of the Paris office—such as the sunshine recorder, anemometer, anemoscope, and thermometers—are exposed on top of the Eiffel Tower, and are connected electrically with the instrument room at the central bureau. Instruments exposed at the central bureau are, of course, also in operation. The sunshine recorder in use was the glass ball. The rain and snow gages were placed on the ground in the rear of the building, in an open court, which apparently offered an excellent exposure. The Richard recording hair hygrometer was noted, and Doctor Angot said that the record it made was highly satisfactory.

The weather in Paris on December 13 was rainy, while on the 14th there were some showers and snowsqualls, with intermittent sunshine; the temperature, however, was comparatively mild. As I journeyed eastward from Paris across the Continent of Europe, I could not help noticing the increasing cold as the interior was approached. While there was no snow visible in France, except on the distant mountains, by the time Strassburg was reached the ground was covered, and it became deeper and deeper as the route lay thru the Black Forest, and by the time Munich was reached, it seemed as if the average depth was nearly one foot.

I remained in Munich until after Christmas, and it was on December 21 that I visited the meteorological office, meeting Dr. Fritz Erk, the director. From the time of my arrival in Germany up to that date there had been no sunshine. Each day was much like the others; light snow continued falling, but the depth did not seem to increase materially. I asked Dr. Erk whether the sun ever shone in Bavaria thru the winter, and he smiled and answered that the clouds were quite low and that the sun would shine soon. His forecast was well verified, as December 22 was quite clear, but there was a quick return to cloudy weather with snow flurries on December 23, and it is my recollection that the same conditions prevailed in Munich practically during the balance of my stay. The weather was not disagreeable, however, but rather the contrary, and everything lookt clean and bright under the newly fallen snow.

I was surprised to learn that there is no general meteorological service in Germany, but that each principality or kingdom has its own bureau. The central station of Bavaria is in Munich, and it is here that the forecasts for the kingdom are made. All the daily reports are received and sent out by telephone. The charts are seldom fully completed before noon and the forecasts are issued at 3 p. m. for a period of twenty-four hours. One hundred copies of the weather map are issued from the Munich office each day, and there is a small subscription price. It is a two-page publication, printed only on the inside, with the general weather chart on the left and a tabulated bulletin on the right and miscellaneous data and forecasts at the bottom. There is only one working chart used in the forecast room. A snow chart also is issued from the Munich office each week, which shows the depth of snow thruout the kingdom, special reference being given to the depth in the mountains.

The instrumental equipment is not important. The wet and dry-bulb thermometers were placed immediately outside the window on the north side, overlooking the street, in a galvanized-iron shelter, open at the bottom, which resembled at a distance the tipping-bucket rain gage used by the United States Weather Bureau. There is no arrangement provided for fanning the wet bulb when an observation is being taken. A hair hygrometer recording on a dial is in use, but the station has no hygrograph. Doctor Erk has the title of professor in the university and gives daily lectures to students on practical work. Some research work has been done with captive balloons. A display of meteorological instruments, the barometer and thermometer, was noted in three prominent places in Munich; they were not, however, the property of the meteorological service, and evidently were used as advertisements for an instrument maker, as they afforded an excellent display and attracted many people. I was imprest with the amount of interest that was taken in meteorological work there, and in several rooms of the art galleries were located wet and dry-bulb thermometers to indicate the relative humidity of the atmosphere, there being also pans containing water, connected with radiators, to maintain a certain amount of moisture.

I arrived in Vienna on the night of December 27, and the

weather was much the same here as in Bavaria. I was much impress with this snow-clad country. There seemed to be a remarkable uniformity in its distribution. The evergreen trees were covered as well, and I could not but feel that from the interior of Europe originated the tales and pictures in regard to Santa Claus. I understand that this uniform snow covering during the winter is customary; and this is possible, as the snow usually falls without drifting—there being little wind—and is often moist and clings to the trees. Moreover the temperature continued practically the same while I was in Germany and Austria, apparently just a few degrees below freezing, there being no melting whatever.

My chief hope in visiting Vienna was to meet Dr. Julius Hann, former director of the meteorological service but now retired, and fortunately I was not disappointed. At my first call at the central office on December 29 I found it closed, the concierge informing me that it was not open after 1 p. m., except for the purpose of observations late in the afternoon. On the morning of the 30th I called again and had a most pleasant visit with Doctor Hann. I brought to him kind messages of which I was the bearer from America. The doctor exprest great pleasure in receiving me, and was much interested in the progress of meteorological science in America. Altho not actually engaged in directing the bureau in Austria, he still maintains his connection with the service and retains a room in the observatory, where he is continuing his writings. Doctor Pernter, the present director, was absent on a vacation. Doctor Hann, after according me a most pleasant reception, requested Mr. Exner, who was a visitor to the Central Office at Washington in 1905, to show me thru the meteorological office. The location of the observatory building differs much from the other observatories which I visited in Europe. Instead of being situated in the thickly settled portions of the city, as the others are, the central office at Vienna is on a prominence on the outskirts of the city, on a street called Hohe Warte, the building being quite spacious, of frame construction, and surrounded by a large lot. The Vienna office is the central station for the greater portion of Austria, but there are forecast centers at Budapest, Trieste, and Pola, the latter two being under the jurisdiction of the Minister of Marine. Forecasts are issued daily about 2 p. m., and cover the ensuing twenty-four hours. They are telegraphed over the government lines and furnished to post-offices. About a hundred weather maps are issued and are sold to subscribers at 3 kroners per month. The publication consists of two pages, a tabulated bulletin on one side and a general weather chart on the other. This chart in its construction resembles somewhat the weather maps used in the United States.

The charts used in forecast work comprise the morning working chart, a separate temperature chart, and the general chart of the previous night. Of the meteorological instruments I especially noted one which recorded the pressure of the wind. It had a diaphragm or pressure plate which was held by springs, and turned with the vane, facing the wind at all times. A glass ball sunshine recorder is in use here also. The thermometer shelter was located above the sod, but supported against the building on the north side. Exposed in the shelter are a Richard recording hair hygrometer and a Lambrecht hygrometer with an index recording on a dial, also stationary wet and dry-bulb thermometers. The soil thermometers were exposed at the station at depths of 1, 2, 3, and 4 meters, respectively, inclosed in a drainpipe. There are also a thermometer placed just below the surface of the soil, and maximum and minimum thermometers right on the surface, similar to those exposed in St. James Park in London. The electrometer and radiation thermometers are also used.

My night ride in the train thru the Venetian Alps from Vienna to the Adriatic on December 30–31 was most interesting. A heavy snowstorm had occurred in the mountains during the previous day, and the trees and the ground were well covered with newly fallen snow. The immense evergreen trees, towering above with their white mantles in the clear moonlight, afforded a grand sight to the traveler. Altho no weather that could be considered really cold had been thus far experienced by me in Europe, the temperature, as I said before, being only a few degrees below the freezing point, yet I anticipated much warmer weather on approaching the Adriatic, and had some idea that as soon as so-called "sunny Italy" was reached summer temperatures would be experienced. On my arrival in Venice, however, the air actually felt much colder than any previously experienced on the trip. In fact, according to my own sensations, the weather at Venice was by far the coldest experienced by me during the entire winter of 1906–7, whether in America or in Europe. It is true that the minimum temperature at Venice was only a few degrees below the freezing point, but as the air was well-nigh saturated with moisture from the Adriatic and the innumerable canals, the feeling was of that damp chill which penetrated almost the very bones. There was even a little snow in patches on the ground, but the uniform snow covering was not observed in any place after having past south of the Venetian Alps. I had been advised by friends that I might have constant use for an umbrella in Italy, as my visit was apparently timed with the rainy season, but a slight mist that occurred on the morning of January 2, while I was en route from Venice to Genoa, was the only wet weather that I experienced during a period of nearly three weeks in Italy.

The meteorological station in Venice is on the Lido, and is under the jurisdiction, I understand, of the marine service. The observatory can be plainly seen across the Grand Canal. Thru lack of time I did not visit the observatories either here or in Genoa, as I expected to devote considerable time to the central bureau in Rome. By the time of my arrival on the other side of the Italian Peninsula at Genoa the temperature had risen to a marked degree, the air being quite balmy. Going farther south to Florence a day later the air was rather chilly, but still quite pleasant in the daytime, except that a strong wind was blowing constantly down the valley of the Arno. This was said by the residents to be quite an unusual occurrence. During the remainder of my stay in Italy the weather was well nigh perfect, "sunny Italy" being at its best.

I was able to spend a week in Rome. On the afternoon of January 11 I had a pleasant visit with the Rev. Father Hagen, S. J., director of the Vatican Astronomical Observatory, and former director of the Georgetown University Observatory, near Washington, D. C. The former summer residence of Pope Leo XIII, located in the center of the Vatican garden, is being made into a new observatory. It is not expected that any meteorological work will be carried on here, except what is required in connection with the astronomical work.

The entire day of January 12 was practically given over to a visit to the central meteorological office located in the building of the Collegio Romano near the Corso. I went to the bureau in the morning, believing that Dr. L. Palazzo, the director, could speak English, having been thus advised on on the previous day, and I consequently made no provision for an interpreter. I found, however, that my informant was mistaken, but the director soon found a common ground upon which we could meet. He immediately suggested that I write what I desired to say in English and he would write in French. Altho this was somewhat slow, we got along very well for something like an hour and a half, having no difficulty whatever in reading each other's messages. I desired, however, to go into matters in greater detail than was possible under the limitations referred to, and at Doctor Palazzo's invitation I called again in the afternoon provided with an interpreter, and was shown over the entire bureau by the director. The central bureau has no observatory of its own in Rome. In

fact, the meteorological observatories thruout Italy are not strictly a part of the meteorological service. There is a meteorological observatory in the building of the Collegio Romano, where the central bureau is located, but the observatory is merely a part of the astronomical observatory of the Collegio Romano, and has a director who is a professor in the institution. There is also a meteorological observatory on the Capitoline Hill, which is, I understand, maintained by the municipality of Rome. Observatories similar to these are scattered thruout Italy, and report their observations to the central bureau thru an arrangement with either their institution or municipality.

In the forecast room a general working chart and supplementary temperature and pressure charts are used, as well as a chart showing the general conditions of the previous evening. The telegraphic reports are not received completely until about noon, and the forecasts are issued about 2 p. m. for all Italy, for the ensuing twenty-four hours. The printed daily publications embrace tabulated bulletins and weather maps quite similar to those issued in other European meteorological offices. The subscription price in Italy is 16 francs per year.

There seemed to be nothing special to note in connection with the instrumental equipment of the meteorological observatory visited. The recording hair hygrometer was found in use here also, but Doctor Palazzo said it was not giving satisfaction, contrary to the opinion received in other places. The wet and dry-bulb thermometers in the shelter were located on the roof on a stationary standard, but a fan was placed near the bulbs so that when a spring was wound up the air was set in motion, the effect being quite similar to that secured by our whirling apparatus. There is a large number of small stations in Italy where research work is being done, and special attention is now being given to the meteorological conditions in the tobacco fields. One of the divisions of the central bureau, directly under Professor Morti, has charge of the observations of earthquakes.

I had been informed by many during my visit that the winter was the coldest experienced during the past twenty-five years, and I was interested to learn what a comparison with the actual record would show; but I was not surprised to learn from Doctor Palazzo that the winter was very nearly normal. I have frequently been imprest, in my own experience, with the fact that people forget easily about the past, especially when weather is concerned, and I was rather interested in finding the same conditions obtaining abroad.

My trip from Naples to Mount Vesuvius on January 14 was made partly with the hope of visiting the observatory after my descent from the crater, but as I reached the funicular railway station, near which the observatory is located, I found my train, the last of the day, was about to start on the return trip, and I had but a passing glimpse of a Robinson anemometer and a thermometer shelter on the outside of this far-famed observatory.

In my traveling southward thru Italy I was much imprest with the increasing barometric pressure, and during my stay at Naples the barometer was uniformly at 30.5 inches. Sailing from that port on January 16 westward to Gibraltar there was practically no change in the reading of the barometer, and the weather continued much the same as in Italy. After passing by the "big rock" out into the Atlantic, bound for New York, I naturally expected the ship to turn in the direction of the port of destination. The course, however, lay to the south of west until the parallel of 35° was reached at 22° west longitude, passing about 300 miles south of the Azores. The course was thence directly west along this parallel as far as 60° west longitude, when it was changed to the northwest toward New York. This is the regular course of the Mediterranean fleet, and masters are required by the regulations of their companies to follow it during the winter season, as it lies along the permanent "high" where storms are infrequent. In fact the winds were light and gentle during the greater part of this trip across the ocean, and the weather was quite summerlike, until the course turned to the northwestward across the Gulf Stream. This was in strong contrast with the stormy weather experienced on the northern route on my voyage eastward. During the summer season, however, when storms are infrequent, the sailing course of these vessels from Gibraltar is nearly in a direct line passing north of the Azores. New York was reached on January 31, 1907.

A BENEFICENT SCIENTIFIC MISSION.

The Syrian Protestant College at Beirut was founded in 1863 and opened in 1866, thru the efforts of North American Presbyterian missions. Complete courses are given in commerce, medicine, and biblical archæology. Formerly the Arabic language was used, but now English is used, and many Beirut students have wandered over to the United States. Among the faculty are Rev. George E. Post, of New York, the professor of surgery; Dr. A. E. Day, of natural sciences, and Robert H. West, of mathematics and astronomy.

The Lee Observatory was founded in the year 1874 for special astronomical studies. The meteorological record began in June, 1874. The record is maintained by the students and assistants, of which there is a large number, under the especial oversight of the director. The officials responsible for this series are therefore as follows: 1874–1882, Rev. C. V. A. Van Dyck; 1882–1884, Dr. Jaris Nime; 1884–1899, Prof. Robert H. West; 1899 to date, Raymond S. Dugan. The observatory is on a high, rocky ridge that extends toward the north and northwest, above the sea. It is in latitude 33° 54′ 20″ N., and longitude 35° 28′ 10″ E. The cistern of the barometer is at present 35 meters above sea level. This series of observations, now continued for over thirty years, is the longest and most important in any portion of the Turkish dominion. From the beginning observations have been made three times a day, originally at 9 a. m., 3 and 9 p. m., but now at 8:30 a. m., 2:30 and 8:30 p. m. Since February, 1894, a Richard barograph has been in operation, and from some earlier date a Richard thermograph also. The observations have been published quite regularly in the annual volume of the Central Institute of Austria. The data for Beirut and Jerusalem afford almost the only basis we have for a statistical study of the climate of Palestine, and it is proper to say that we still need additional observatories in that region, especially a station on the summit of Mount Carmel, which is only 1400 feet above sea level (latitude 32° 51′ N., longitude 34° 58′ E.), and is easily made habitable.

May we not hope that all medical and educational missions will do as much for science as is anyway practicable. Especially may all missions imitate the example of the Jesuits in the Philippine Islands, where a great system for the study of climatology and for forecasting storms has been established by them. Such general applications of science contribute to the material progress and welfare, and hence to the intellectual and religious development of a nation, quite as much as any other form of activity. In modern times the first departure from a purely theological or religious mission was the establishment of medical missions, of which we have notable examples in the work of Dr. Peter Parker, at Canton, and George E. Post, at Beirut. Whatever missions can do for the intellectual and physical welfare of the nations is a truly noble work, and we must look upon a well organized weather bureau as most beneficent in all its relations to the people.

INTERCONVERSION OF CENTIGRADE AND FAHRENHEIT DEGREES.

As many American and English meteorologists find difficulty in thinking in the centigrade system, we call attention to

a convenient formula and rule lately devised by Doctor Hellmann by which one may convert centigrade to Fahrenheit, or vice versa, with the least possible trouble. Ordinarily we say that one degree on the centigrade scale is nine-fifths of one degree on the Fahrenheit scale, but the multiplying by nine and dividing by five is awkward, and Doctor Hellmann simply substitutes eighteen-tenths for nine-fifths, and then instead of this writes 2 — 2/10. In this way any number of degrees on the centigrade scale is converted to the equivalent number on the Fahrenheit scale by first multiplying by two and then subtracting from this product one-tenth part of itself; for example, 17 centigrade is 34 — 3.4 = 30.6. Fahrenheit. Some may prefer to modify the operation as follows: From the original number subtract one-tenth of itself and then multiply by two. Thus 17 C. — 1.7 = 15.3, which multiplied by 2 equals 30.6. We have still to add 32°, making in all 62.6°, in order to get the temperature on the Fahrenheit scale.

The conversion from Fahrenheit to centigrade, according to Hellmann's rule, is not quite so simple, as he writes the formula as follows: $(\frac{1}{2} + \frac{1}{2} \cdot \frac{1}{10} + \frac{1}{2} \cdot \frac{1}{100}$, etc.) (F.— 32). The first factor in the parenthesis is equivalent to 0.5555 + = 5/9. For most persons it is easier to divide by 2 than to multiply by 5, and the formula may be written

$$C. = \tfrac{1}{2}\ (F. - 32)\ (1 + \tfrac{1}{10} + \tfrac{1}{100} + \tfrac{1}{1000}\ \text{etc.},) = \tfrac{1}{2} \cdot \tfrac{10}{9}\ (F. - 32).$$

The computation is made as in the following example: $\frac{1}{2}(62.6 - 32) = 15.3$; and $15.3 + 1.53 + .153 + .0153 + .00153 = 16.99983+$, or 17.0.

Probably this and other methods have already been used by persons in England and America.

METEOROLOGICAL WORK AT CAMP WELLMAN, DANES ISLAND, SPITZBERGEN.

The Wellman Chicago Record-Herald Polar Expedition was organized about the first of January, 1906, to carry out Mr. Walter Wellman's plan of reaching the North Pole by means of an air ship or dirigible balloon.

Mr. Henry B. Hersey, Inspector, U. S. Weather Bureau, having volunteered for the service, was assigned by Prof. Willis L. Moore, Chief of the Bureau, to accompany the expedition as meteorological observer. He was also appointed by the National Geographic Society of America to act as the representative of that organization with the expedition. About May 1, 1906, Mr. Hersey accompanied Mr. Wellman to London and Paris, assisting him in the organization of the work and the assembling of the equipment. A little later he was appointed executive officer of the expedition, second in command. This appointment was accepted and Mr. Hersey was directed to take charge of the first section, sailing from Tromsoe, Norway, to Danes Island, Spitzbergen, with the force and material for the erection of the living quarters, workshop, balloon house, and gas plant. This section of the expedition was made up of eighteen men and sailed from Tromsoe June 15 on the steamer *Frithjof* and arrived at Danes Island on the 21st.

The meteorological instruments were landed and put in position on June 25, 1906, and regular observations began on the 26th. The outfit consisted of standard U. S. Weather Bureau maximum, minimum, and dry thermometers, also a whirling hand psychrometer (a sling psychrometer), consisting of dry and wet-bulb thermometers on one support. There were also a standard Weather Bureau anemometer and single register, a Richard thermograph, an aneroid barometer, and a Richard meteorograph, recording temperature, barometric pressure, humidity, and wind velocity. The thermometers were installed in a latticework shelter of standard Weather Bureau pattern (small size).

The anemometer was first put up on a pole, attached to a building known as Pike House, at an elevation of about 38 feet above the ground and 46 feet above sea level, and back about 70 feet from the water front of Virgo Harbor. The thermometer shelter was erected on a little knoll about 150 feet west of Pike House and about 70 feet back from the water front.

The exposure of the thermometers was entirely satisfactory, but that of the anemometer was poor. About 200 yards south of Pike House there is a steep hill rising to over 300 feet in height, and to the west about 600 yards another ridge of hills about 500 feet high; to the northwest across the strait, or Dans Gat, as it is called, Amsterdam Island rises to a height of about 500 feet. To the east and northeast the exposure is open to the wind.

No standard rain or snow gage was used, but the amount of precipitation was estimated or approximately measured in an improvised tin-can gage by Mr. Hersey, and as he has had more than twenty years' experience in meteorological work and his estimates were carefully made, his figures may be considered approximately correct.

The latitude and longitude of the station were determined by Mr. Hersey and Mr. Felix Riesenberg, assistant scientific observer of the expedition, to be as follows: latitude 79° 43′ north, and longitude 11° 9′ east from Greenwich. The time used in the records of the station is one hour faster than Greenwich.

On July 5 the steamer *Laura*, a private steamer with a hunting party on board, stopt in the harbor. She had on board a mercurial barometer which was being sent from the observatory at Christiana to Jan Mayen Island for use in meteorological work there. It appeared to be in good condition, and the aneroid in use at this station was compared with it and found to agree closely. On July 11 the barometer was moved to the new Wellman House, about 300 yards northwest of Pike House. This made a change in the elevation of the barometer from about 12 feet to about 25 feet above sea level.

August 10 the anemometer was moved from Pike House to the top of the frame work of the gas apparatus, near Wellman House. This made a change in the height of the cups above the ground from 38 to 40 feet and above sea level from 46 to 54 feet. The exposure was somewhat improved by the change.

August 18 the thermometer shelter was moved from near Pike House to a new location near Wellman House, about 300 yards northwest of its former site. A good exposure was obtained.

August 19 a standard U. S. Weather Bureau 4-foot wind vane was erected on top of Mount Moore, about 400 yards southwest of Wellman House, and at an altitude of about 500 feet above sea level. This gave an excellent exposure for obtaining the true direction of the wind.

DAILY METEOROLOGICAL JOURNAL FROM JUNE 21 TO AUGUST 31, 1906.

June 21.—Expedition arrived on steamer *Frithjof* and dropt anchor in Virgo Harbor at 7 p. m., after a hard fight thru the heavy ice in Dans Gat. Snow flurries prevailed thruout the day and following night.[1] Estimated snowfall at 6 p. m., 3.0 inches. Temperature below freezing all day. Dans Gat and harbor full of heavy pack ice.

June 22.—Snowing all day with a brisk northwest wind. Snowfall, 2.0 inches. Below freezing all day.

June 23.—Another day of snow flurries, but not so heavy. Snowfall, 1.0 inch. Freezing all day.

[1] The terms "night", "evening", "morning", are apparently used to designate the periods to which they are applied in the United States; it is plausible that the term "night" is used for the period during which the men were sleeping and no note was taken of weather conditions. At latitude 79° 43′ the sun would remain above an unobstructed horizon from about April 14 to about August 29, while twilight would not give way to full darkness till after the autumn equinox. See also the entry of August 27.

June 24.—Light snow flurries at intervals. Very little wind. Snowfall, 0.5 inch. Freezing all day.

June 25.—Snow flurries all day; wet, sticky snow. Light northerly winds. Snowfall, 3.0 inches for the twenty-four hours ending 6 p m. Freezing all day. Meteorological instruments erected and put in order to-day.

June 26.—Occasional snow flurries, with light northerly winds. Snow was light and feathery and the sun broke thru the clouds at intervals. Snowfall at 6 p. m., 0.2 inch melted. Meteorological instruments all working to-day.

June 27.—Slight trace of snow in the morning followed by partly cloudy and pleasant weather all day. Fresh to brisk east to northeast wind. This wind began to clear the heavy ice floes out of the strait or Dans Gat, as it is called, and opened a channel from Smeerenberg Bay westward to the ocean.

June 28.—Partly cloudy, with bleak northeast wind all day. The clouds were low and hung over the mountain tops, giving light snow flurries over some of the mountains.

June 29.—Partly cloudy, with bleak north to northeast wind all day. Snow flurries in the mountains. Cold, penetrating wind.

June 30.—Not quite so cold. Partly cloudy, with fresh to brisk northerly winds in the forenoon; cloudy in the afternoon, with northeast winds. Barometer falling slowly until about 5 p. m., when it became stationary. Threatening weather in the evening.

July 1.—The warmest day experienced so far. Light rain from 9 to 11 a. m. Fresh to brisk northeast wind. Snow melting rapidly and the floe ice in Virgo Harbor becoming spongy. The Gat opened from the east side of Smeerenberg Bay westward to the ocean. Ice still solid in Smeerenberg Bay south of Gat.

July 2.—A remarkably pleasant, mild day. Clear weather with light easterly wind. Snow and ice melting rapidly.

July 3.—It was nearly calm from midnight until 2:45 a. m. when a fresh southerly breeze sprung up, continuing with varying force all day and becoming brisk southwest late in the afternoon. Cloudy all day, with a few drops of rain about 8:30 a. m. Ice all drifted out of Virgo Harbor, except a couple of large floes which were aground. Snow and ice melting rapidly.

July 4.—Cloudy all day, with fresh to brisk southwest wind. Light rain, 11:40 a. m. to 12:10 p. m. Ice and snow melting fast.

July 5.—Cloudy all day, with light rain at intervals. Brisk southerly wind until about 5 p. m. when it became light and variable. Barometer falling slowly in the afternoon.

July 6.—Cloudy all day, with light, misty rain from 12:30 p. m. to 5:30 p. m. About calm from early morning until 11:30 a. m. when a fresh southerly breeze sprung up; this veered to southwest about 1:30 p. m. Estimated rainfall about .04 inch. The barometer rose all day and the temperature fell a little. Ice and snow continued to disappear rapidly.

July 7.—Clear, mild weather until night when it became cloudy. Brisk southerly wind until 7 p. m. when it became light and shifted to northwest. Barometer falling steadily all day.

July 8.—Cloudy until about 8 p. m. when it partially cleared. Brisk southerly wind until noon when it became light and variable. Falling barometer in the evening.

July 9.—Quite warm in the morning with light to fresh easterly wind; cloudy in the afternoon with brisk southwesterly wind. Trace of rain from 5:50 p. m. to 8:30 p. m.

July 10.—Cloudy, mild weather all day. Light to fresh easterly wind.

July 11.—Cloudy with low fog on the mountains. Light rain from 10 a. m. to 12:50 p. m. Light to fresh southerly wind.

July 12.—Mild, cloudy weather in the forenoon with mild southerly wind. Temperature fell in the afternoon and wind became variable in direction. Trace of rain at intervals in the afternoon and a few flakes of snow about 6:20 p. m.

July 13.—Cloudy and mild with light northwest wind. The wind became brisk in the afternoon from the north and northeast with partly cloudy weather; cooler at night.

July 14.—Generally clear weather with brisk northerly wind all day. Moderate temperature; barometer rising slowly.

July 15.—Clear weather with brisk north wind all day. Rising barometer.

July 16.—A very pleasant day. Clear weather with mild temperature and light northerly wind. Calm at times.

July 17.—Clear all day, almost calm in the morning, but brisk northerly wind in the afternoon. Very warm in the forenoon.

July 18.—Strong north wind in the morning. About 9 a. m. the wind became light and variable in direction. In the afternoon it changed to south and was brisk and gusty. Clear weather with mild temperature and rising barometer all day.

July 19.—Clear weather with brisk to high northeast wind all day, ranging from 20 to 25 miles most of the day. Falling barometer.

July 20.—Clear weather with brisk to high northeast wind till 2:30 p. m.; afterward it was light. The temperature was a little lower to-day and the wind was quite penetrating. The barometer remained nearly stationary at 29.86 inches.

July 21.—Clear with brisk to high north wind. During the afternoon it was not so high and the temperature rose to 50.0°. Slight fall in barometer.

July 22.—Generally clear weather all day. Light variable wind in the forenoon, followed by brisk northerly wind in the afternoon; light and variable again at night. A very pleasant day.

July 23.—Nearly calm in the morning with warm, partly cloudy weather. About 6 p. m. it became cloudy and a brisk south wind set in. Barometer fell steadily all day.

July 24.—Brisk to high southerly winds all day, rather puffy and variable in force. Partly cloudy in the morning, followed by foggy, cloudy weather in the afternoon. Barometer rose steadily all day.

July 25.—Cloudy with light southerly wind during the day, followed by clearing at night.

July 26.—Cloudy and nearly calm in the morning. Trace of rain 8:45 a. m. to 9 a. m. Brisk south breeze changed to west at noon and to north at 5 p. m. Barometer fell steadily all day.

Mr. Hersey left on the *Frithjof* at 5 p. m. for Red Bay, leaving Mr. Riesenberg in charge of the weather work.

July 27.—Mr. Hersey returned from Red Bay at 6 a. m.

A strong south wind sprang up about 2:20 a. m., reaching a velocity of 26 miles an hour at 2:30 a. m., and continued brisk until about 9 a. m., when it became light. Light rain began at 2:30 a. m. and continued at intervals until about noon, when it became moderately heavy and rained steadily the remainder of the day. This was the first rain of any importance which had occurred since the opening of the station. At 6 p. m. the rainfall amounted to .65 inch. This was measured in an improvised "tin-can" gage. Barometer rose slowly all day.

Mr. Hersey left at 9:30 p. m. on the *Frithjof* for Bell Sound, leaving Mr. Felix Riesenberg in charge of the meteorological work.

July 28.—Rain ended during the preceding night; amount .40 inch. Cloudy in the early morning but cleared late in the day. Light to fresh southerly winds all day. Slowly rising barometer.

July 29.—Clear weather, with light to fresh southerly wind.

July 30.—Partly cloudy, with brisk southwest wind.

July 31.—Partly cloudy in the morning followed by cloudy weather with light rain at intervals, continuing into the night.

Fresh southwest wind, blowing in squalls. Rainfall measured .10 inch.

August 1.—Cloudy and cooler, with light north to northeast wind. Light drizzling rain at intervals all day. Rising barometer.

August 2.—Fine and clear, with light, variable wind until 8:30 p. m., when it turned to south and became fresh by midnight.

August 3.—Bright, clear day, with brisk southwesterly wind until night, when it dropt to a light breeze and became variable.

August 4.—Fair and clear, with light, variable southerly wind; cloudy at night.

August 5.—Cloudy, with very light, variable wind all day.

August 6.—Cloudy and nearly calm most of the day.

August 7.—Clear, with brisk southerly wind. Barometer stationary all day.

August 8.—Nearly calm in the morning, with cloudy weather. About noon it cleared with light northerly wind. It was quite foggy at intervals during the afternoon, but became entirely clear again by 6 p. m. and continued clear all night.

August 9.—Clear, with light northwesterly wind all day.

August 10.—Cloudy, with light westerly wind in the forenoon shifting to north in the afternoon. Foggy in the forenoon.

August 11.—Fog in the morning. Clear, with fresh to brisk northerly winds all day.

August 12.—Clear, with fresh to brisk northerly wind in the morning. Cloudy in the afternoon, with light west to northwest wind. Light snow began at 8 p. m. and continued at intervals thruout the night. This was the first snow of any consequence since June 26. It melted about as fast as it fell.

August 13.—Light snow flurries continued at intervals all day, and at 6 p. m. the total for twenty-four hours was .22 inch, melted. It did not remain on the ground, melting almost as fast as it fell. Cloudy with light variable wind.

August 14.—Cloudy with light variable wind and occasional snow flurries. Precipitation, .12 inch.

August 15.—Cloudy with very light southerly wind. Light rain during the preceding night and a trace again at 1:30 p. m. Waterfowl leaving for the south.

August 16.—Cloudy with very light variable wind. Trace of rain about 6 p. m.

August 17.—Clear weather with light to fresh southerly wind. Falling barometer.

August 18.—Clear with light to fresh northerly wind. Falling barometer.

August 19.—Partly cloudy with light southeast wind in forenoon, cloudy with very light variable wind in afternoon. Warm and pleasant all day.

August 20.—Partly cloudy in the forenoon with light variable wind. Clear and nearly calm in the afternoon. Mild temperature and a delightfully balmy day.

August 21.—Clear weather with light variable wind.

August 22.—Partly cloudy with light variable wind. Light fog in the morning.

August 23.—Cloudy with light variable wind. Waterfowl nearly all gone south. A few guillemots, sea parrots, gulls, and eider ducks remain.

August 24.—Partly cloudy with light northeast wind.

August 25.—Cloudy with light to fresh southerly wind. Trace of rain during the preceding night. Steadily falling barometer.

August 26.—Trace of rain during the preceding night. Cloudy with fresh to brisk southerly wind until about 6 p. m. when it shifted to northeast and snow began to fall; this continued all night, accompanied by freezing temperature toward morning. For a short time about 6:20 p. m. the snow was very heavy. The ground being warm the snow melted about as fast as it fell.

TABLE 1.—*Record of observations at Camp Wellman, Danes Island, Spitzbergen, from June 21 to August 31, 1906. Observations taken by the observer personally at 6 p. m., 15th meridian, east.*

JUNE, 1906.

Day of month.	Barometer reading. (sea level.)	Thermometers.		Wind.		Precipitation—24 hours ending 6 p. m.	Character of day.*
		Dry.	Wet.	Dir.	Vel.		
	Inches.	°	°		*Miles.*	*Inches.*	
21						.30	Cloudy.
22						.20	Cloudy.
23						.10	Cloudy.
24						.05	Cloudy.
25						.30	Cloudy.
26		31.0	30.0	n.	8	.02	Cloudy.
27		31.5	30.5	ne.	6	T.	Pt. cloudy.
28		30.0	29.5	ne.	6	0	Pt. cloudy.
29		28.3	27.3	n.	9	0	Pt. cloudy.
30		33.0	32.0	ne.	7	0	Cloudy.

*Average condition during day.

JULY, 1906.

1	29.72	36.0	34.5	ne.	7	.06	Cloudy.
2	29.78	39.0	36.5	e.	6	0	Clear.
3	29.82	40.5	37.5	sw.	13	T.	Cloudy.
4	29.84	38.5	37.0	s.	16	T.	Cloudy.
5	29.75	38.0	37.0	s.	3	.06	Cloudy
6	29.76	34.2	33.7	w.	6	.04	Cloudy.
7	29.93	39.0	37.0	s.	7	0	Clear.
8	29.92	38.0	37.0	n.	4	0	Cloudy.
9	29.80	44.0	41.0	sw.	2	T.	Cloudy.
10	29.76	42.5	40.0	e.	4	T.	Cloudy.
11	29.72	42.0	41.0	sw.	10	.01	Cloudy.
12	29.73	36.0	35.0	w.	5	T.	Cloudy.
13	29.87	37.5	35.5	ne.	11	T.	Cloudy.
14	29.89	40.0	37.5	n.	12	0	Clear.
15	30.03	38.0	36.5	n.	7	0	Clear.
16	30.09	43.0	40.0	ne.	8	0	Clear.
17	29.69	47.0	42.0	n.	12	0	Clear.
18	30.20	45.0	42.0	sw.	8	0	Clear.
19	29.97	39.0	38.0	n.	25	0	Clear.
20	29.86	37.0	35.5	ne.	17	0	Clear.
21	29.77	47.0	44.0	ne.	10	0	Clear.
22	29.75	43.5	41.5	ne.	18	0	Clear.
23	29.56	50.5	45.0	s.	14	0	Pt. cloudy.
24	30.01	45.0	43.0	sw.	12	0	Cloudy.
25	30.17	44.0	42.0	e.	8	0	Cloudy.
26	30.06	45.0	44.0	n.	5	T.	Cloudy.
27	29.97	41.0	41.0	s.	6	.65	Cloudy.
28	30.16	45.0	43.0	s.	4	.40	Clear.
29	30.17	47.0	45.0	sw.	4	0	Pt. cloudy.
30	30.09	42.0	41.0	s.	11	0	Pt. cloudy.
31	29.96	44.5	43.0	s.	4	.10	Cloudy.
Sums						1.29	
Means	29.90	41.6	39.6	s.	9		

*Average condition during day.

AUGUST, 1906.

1	30.03	36.0	35.0	ne.	3	.02	Cloudy.
2	30.10	39.0	38.0	s.	3	0	Clear.
3	29.92	43.0	41.0	sw.	11	0	Clear.
4	30.04	42.0	40.5	s.	3	0	Clear.
5	30.02	41.5	40.0	w.	2	0	Cloudy.
6	30.10	39.5	38.5	sw.	3	0	Cloudy.
7	30.13	40.0	38.5	sw.	6	0	Clear.
8	30.15	38.0	37.0	ne.	3	0	Pt. cloudy.
9	30.22	38.5	37.0	n.	5	0	Clear.
10	30.27	36.5	36.0	nw.	3	0	Cloudy.
11	30.20	38.0	36.5	n.	7	0	Cloudy.
12	30.16	37.0	36.5	sw.	3	0	Cloudy.
13	30.13	34.0	34.0	w.	3	.22	Cloudy.
14	30.17	34.0	34.0	s.	4	.12	Cloudy.
15	30.13	39.7	39.2	s.	2	.01	Cloudy.
16	30.10	40.3	40.3	s.	3	T.	Cloudy.
17	30.03	37.0	35.0	ne.	2	T.	Cloudy.
18	29.95	37.7	35.7	n.	6	0	Clear.
19	29.83	44.3	43.8	se.	1	0	Pt. cloudy.
20	29.81	44.0	42.0	ne.	2	0	Pt. cloudy.
21	29.80	38.0	37.0	w.	1	0	Clear.
22	29.88	38.5	37.0	sw.	1	0	Pt. cloudy.
23	30.02	37.0	35.0	w.	2	0	Cloudy.
24	30.11	36.5	35.0	ne.	3	0	Pt. cloudy.
25	30.02	36.5	35.0	sw.	5	T.	Cloudy.
26	29.84	36.0	36.0	ne.	4	T	Cloudy.
27	29.96	31.7	30.2	ne.	15	.15	Cloudy.
28	29.89	31.5	31.0	ne.	12	.09	Cloudy.
29	29.84	32.0	32.0	w.	1	.15	Cloudy.
30	29.80	32.0	31.0	w.	6	.13	Cloudy.
31	29.80	30.7	30.7	w.	6	.65	Cloudy.
Sums						1.54	
Means	30.01	37.4	36.4	ne.	4		

*Average condition during day.

August 27.—Light snow thruout the preceding night and continuing all day with brisk to high northeast wind. Rising barometer and falling temperature, below freezing all day.

TABLE 2.—*Hourly temperatures from corrected thermograph readings at Camp Wellman, Danes Island, Spitzbergen, from June 21 to September 3, 1906.*
(Standard of time in local use, 15th meridian east.)

JUNE.

Date.	A. M. 1	2	3	4	5	6	7	8	9	10	11	Noon.	P. M. 1	2	3	4	5	6	7	8	9	10	11	Mid't.	Sum.	Mean.	Maximum.	Minimum.
21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30	30	30	30	28	30	30	30	28	27	27	27	.....	.....	.....	.....
22	28	28	28	28	28	27	27	28	28	28	28	28	28	28	28	28	28	30	28	28	28	28	28	28	672	28.0	30	27
23	28	28	28	28	28	28	30	28	28	28	28	28	30	30	30	30	28	28	30	30	28	28	28	27	685	28.5	31	27
24	27	27	27	27	27	28	28	28	28	28	28	28	32	30	32	30	28	30	28	28	28	28	28	27	680	28.3	32	27
25	27	27	27	27	28	27	28	32	33	30	30	30	30	30	30	30	28	30	30	30	30	30	32	32	708	29.5	33	27
26	32	30	30	28	30	30	30	32	28	28	30	32	30	30	30	30	31	31	32	30	30	28	27	27	716	29.8	32	27
27	28	28	28	26	28	28	28	28	28	30	30	30	30	30	30	32	32	32	32	32	32	30	30	30	714	29.8	32	27
28	28	28	28	30	30	30	33	35	35	35	35	35	35	35	35	32	30	30	28	30	28	30	28	28	751	31.3	35	28
29	28	30	30	30	28	28	28	28	28	27	27	27	27	27	27	27	27	28	28	28	28	28	28	30	672	28.0	30	26
30	30	30	30	30	30	30	30	28	28	28	28	34	34	32	32	34	32	32	33	34	34	34	34	34	34	759	31.6	34	28

JULY.

1	34	34	34	34	36	34	34	34	34	34	34	38	38	38	32	36	36	36	36	36	36	36	36	36	846	35.2	38	32
2	36	36	36	36	34	33	37	41	43	41	39	38	41	39	41	41	37	39	36	37	37	37	39	37	911	38.0	44	32
3	37	32	32	37	37	37	37	41	39	41	41	44	41	41	42	43	39	40	38	38	38	38	38	38	929	38.7	44	32
4	38	39	58	38	38	38	38	38	38	39	40	38	38	39	39	38	38	38	39	39	39	39	40	40	926	38.6	40	37
5	40	40	40	39	38	39	39	37	39	40	39	40	41	39	39	41	38	38	36	36	36	36	36	36	922	38.4	41	36
6	36	36	35	34	34	36	35	36	37	37	38	39	36	35	35	34	34	34	34	33	34	34	35	35	846	35.2	39	33
7	35	35	36	36	36	37	37	38	39	39	39	41	38	37	37	37	38	39	39	39	39	39	41	41	912	38.0	41	34
8	39	39	38	37	36	34	34	33	34	35	36	36	37	37	37	36	37	38	39	37	37	37	38	38	879	36.6	41	33
9	38	38	38	39	38	40	45	45	45	46	50	45	48	51	48	45	44	44	43	43	42	42	41	41	1039	43.3	51	38
10	39	41	41	40	40	39	40	43	43	45	45	46	43	41	40	41	43	42	42	41	41	42	42	39	999	41.6	47	39
11	43	41	39	39	40	39	39	39	39	41	41	42	42	42	42	42	42	42	41	41	41	41	40	40	978	40.8	44	39
12	40	41	40	40	40	40	40	40	40	40	39	39	39	38	38	37	36	36	35	34	35	35	35	35	912	38.0	41	34
13	35	36	36	36	36	36	38	36	37	37	37	37	37	37	40	39	38	38	37	37	38	39	39	41	897	37.4	41	35
14	40	40	40	40	44	41	39	39	36	36	36	36	36	37	39	40	41	40	40	40	40	40	40	43	943	39.3	44	36
15	43	43	43	44	43	42	43	43	43	41	40	39	39	38	37	37	38	38	36	36	37	37	39	39	958	39.9	44	36
16	40	39	39	41	41	41	41	42	43	44	48	43	42	50	50	48	46	43	45	45	42	45	46	46	1050	43.8	51	38
17	43	46	46	49	46	48	46	50	50	50	54	47	47	47	46	48	47	47	47	46	46	44	44	42	1126	46.9	54	42
18	42	41	38	39	39	38	42	39	41	40	42	49	51	47	46	46	46	45	44	42	42	41	40	40	1020	42.5	51	38
19	39	39	38	38	40	40	44	44	45	40	41	41	39	40	39	38	40	39	40	42	41	42	43	43	975	40.6	45	38
20	40	40	41	41	41	38	38	38	38	37	38	38	38	41	41	39	38	37	36	36	36	37	37	38	922	38.4	43	36
21	38	37	38	40	42	42	40	42	40	40	40	40	40	44	45	45	50	47	44	40	44	43	44	44	1009	42.0	50	37
22	44	43	46	47	45	47	46	50	46	46	45	46	48	46	44	46	45	44	41	45	46	47	50	48	1101	45.9	50	41
23	46	45	47	49	46	46	46	47	51	52	54	55	55	52	53	54	52	50	49	48	43	46	42	40	1168	48.7	56	40
24	43	43	41	40	43	43	45	45	46	45	45	45	44	43	42	43	44	45	45	45	44	42	45	45	1051	43.8	46	40
25	45	45	44	45	45	45	45	45	45	45	46	46	46	46	46	46	46	44	44	44	44	44	43	41	1075	44.8	46	41
26	41	41	42	42	44	43	45	47	46	49	47	48	50	48	46	47	46	45	45	44	44	45	46	48	1089	45.4	50	41
27	48	50	52	46	46	46	44	44	43	43	43	42	42	42	42	42	42	41	41	41	40	40	40	40	1010	43.3	52	40
28	40	40	40	40	40	40	40	40	41	42	43	43	44	45	44	45	46	45	45	45	44	44	43	43	1022	42.6	46	40
29	42	42	42	42	42	42	42	42	42	43	43	43	44	45	46	47	48	47	47	48	47	47	46	46	1065	44.4	48	42
30	48	48	49	50	48	48	46	46	45	45	45	45	45	45	44	44	43	42	42	41	41	42	42	42	1076	44.8	50	40
31	41	41	41	42	43	44	45	45	45	45	43	42	43	43	45	45	44	44	44	44	44	44	44	44	1045	43.5	46	41
S'ms	1253	1251	1250	1260	1261	1255	1270	1289	1293	1298	1311	1311	1312	1313	1305	1310	1302	1287	1270	1263	1258	1265	1274	1269	30731	.....	1424	1161
M'ns	40.4	40.4	40.3	40.6	40.7	40.5	41.0	41.6	41.7	41.9	42.3	42.3	42.3	42.4	42.1	42.3	42.0	41.5	41.0	40.7	40.6	40.8	41.1	40.9	41.3	.....	45.9	37.5

AUGUST.

1	43	43	43	43	43	43	42	42	42	41	38	36	36	36	36	36	36	36	36	36	36	36	35	35	929	38.7	44	35
2	34	33	33	33	33	33	34	35	35	36	36	37	37	38	39	39	39	39	40	40	40	40	40	40	884	36.8	40	33
3	39	39	39	39	40	40	41	41	42	42	43	43	44	45	46	46	44	43	42	42	42	42	42	42	1008	42.0	46	39
4	42	42	41	41	40	38	38	39	40	40	40	43	41	41	41	41	41	42	41	41	41	41	40	40	975	40.6	43	38
5	41	41	43	43	43	43	43	43	43	43	43	43	43	43	42	43	42	42	41	41	40	40	40	39	1008	42.0	43	39
6	39	39	39	39	39	39	39	39	39	39	40	40	40	40	40	40	40	40	39	39	38	38	37	37	938	39.1	41	37
7	37	37	37	37	38	38	39	39	40	40	41	41	43	43	41	41	41	40	40	40	38	38	38	38	945	39.4	43	37
8	40	40	40	40	40	40	40	40	42	40	40	40	39	39	39	39	39	38	35	38	35	36	43	45	959	40.0	45	35
9	44	45	45	45	45	45	43	41	40	40	39	39	38	38	38	38	38	38	37	37	37	37	37	37	961	40.0	45	37
10	37	37	37	37	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	868	36.2	38	36
11	36	36	36	36	36	36	35	34	35	36	36	36	36	36	36	36	36	36	38	38	38	38	37	37	871	36.3	38	34
12	36	36	36	36	36	35	35	36	37	38	39	39	40	40	41	40	38	37	37	37	37	37	37	37	897	37.4	41	35
13	37	37	37	37	37	37	37	37	37	37*	35*	35*	35*	35*	35*	32*	32*	34	32*	32*	32*	32*	32*	32*	835	34.8	38	32
14	32*	32*	32*	32*	32*	32*	34	34	34	34	34	34	34	34	35	36	35	34	32	32	34	34	34	34	804	33.5	36	32
15	34	34	36	36	36	36	36	36	37	38	39	39	39	39	39	39	39	39	40	40	40	40	40	40	912	38.0	40	34
16	38	38	38	38	38	38	38	38	39	39	39	39	39	39	39	39	39	40	40	40	40	40	40	40	935	39.0	40	38
17	40	39	39	39	39	39	39	40	40	39	38	38	38	38	38	38	37	37	37	37	37	37	37	37	917	38.2	40	37
18	37	37	37	37	37	37	36	36	36	36	36	36	36	36	37	37	38	38	37	37	37	37	38	38	884	36.8	38	36
19	38	38	38	39	40	41	42	43	44	45	46	46	47	47	46	46	45	44	44	44	43	43	42	40	1031	43.0	47	38
20	38	38	40	40	40	40	40	40	40	41	48	48	48	48	47	46	45	44	45	45	45	45	44	44	1039	43.3	48	38
21	44	44	43	44	44	45	46	46	47	47	48	48	48	48	48	45	43	38	37	37	36	35	35	35	1031	43.0	48	35
22	35	35	35	36	36	36	37	37	37	37	37	37	37	38	38	38	39	38	39	39	39	39	39	39	897	37.4	39	35
23	39	39	39	39	39	39	39	39	39	39	39	40	40	41	39	39	38	37	37	37	36	36	35	33	917	38.2	41	33
24	32	32	32	32	32	32	33	33	34	34	34	37	38	38	39	38	37	36	36	36	36	36	35	34	838	34.9	39	32
25	36	36	37	38	37	37	35	35	34	34	34	34	34	34	34	34	34	36	36	36	35	35	34	34	843	35.1	38	34
26	33	33	33	34	34	34	34	34	35	35	36	36	37	37	38	38	37	36	36	35	34	33	33	32	837	34.9	38	32
27	33	32	32	31	31	30	29	28	28	27	27	27	27	27	27	27	27	32	32	32	31	31	29	29	706	29.4	33	27
28	29	29	29	28	28	28	29	29	29	30	30	30	30	31	31	31	31	32	32	32	32	32	32	31	725	30.2	32	28
29	31	31	32	32	31	31	30	30	30	29	29	29	29	29	30	30	31	32	32	32	32	32	32	32	738	30.8	32	29
30	32	32	32	32	32	32	32	32	34	33	33	33	33	33	33	33	33	32	32	32	32	32	32	33	778	32.4	33	32
31	32	32	32	32	32	32	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	748	31.2	33	30
S'ms	1138	1136	1142	1145	1144	1142	1142	1143	1156	1156	1163	1169	1173	1178	1179	1172	1157	1160	1149	1149	1148	1147	1138	1132	27658	.....	1240	1067
M'ns	36.7	36.6	36.8	36.9	36.9	36.8	36.8	36.9	37.3	37.3	37.5	37.7	37.8	38.0	38.0	37.8	37.3	37.4	37.1	37.1	37.0	37.0	36.7	36.5	37.2	.....	40.0	34.4

SEPTEMBER.

1	30	30	30	30	30	30	30	30	30	29	29	29	29	29	30	30	30	29	29	29	29	29	29	30	709	29.5	30	29
2	30	30	30	30	30	30	30	30	31	32	33	34	35	35	35	35	35	34	34	34	34	34	34	34	783	32.6	35	30
3	34	34	34	34	34	34	34	34	34	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Interpolated; self-register not working.

TABLE 3.—*Hourly wind movement at Camp Wellman, Danes Island, Spitzbergen, from June 26 to August 31, 1906. (Standard of time in local use, 15th meridian east).*

JUNE.

Date.	A. M. 0 to 1.	1 to 2.	2 to 3.	3 to 4.	4 to 5.	5 to 6.	6 to 7.	7 to 8.	8 to 9.	9 to 10.	10 to 11.	11 to 12 noon.	P. M. Noon to 1.	1 to 2	2 to 3.	3 to 4.	4 to 5.	5 to 6.	6 to 7.	7 to 8.	8 to 9.	9 to 10.	10 to 11.	11 to 12 midn't.	24 hours. Total.	Max. vel.	Direct'n.	Prevailing direction for the day.
26....	7	9	8	7	5	5	5	3	6	4	4	5	4	5	3	3*	3*	2	2	2	1	8	8	8	117	12	n.	.....
27....	7	7	6	7	6	7	6	8	7	8	7	9	8	7	9	10	8	6	6	7	8	6	6	8	174	10	ne.	.....
28....	6	7	6	7	8	7	7	7	8	8	8	7	7	8	9	8	8	7	6	8	7	9	10	11	184	12	ne.	.....
29....	9	9	9	9	10	9	8	9	10	10	10	9	11	12	11	8	9	9	8	9	9	9	8	7	221	12	ne.	.....
30....	7	8	9	9	9	8	7	7	9	8	7	12	8	9	9	10	10	8	8	7	8	7	7	7	198	13	n.	.....

* Estimated.

JULY.

1....	7	6	7	7	7	7	6	6	5	10	7	7	6	6	9	11*	10*	8	7	7	6	6	6	6	170	13	ne.	ne.
2....	5	5	5	4	8	5	5	4	5	3	5	5	6	7	9	8	10	7	7	6	3	2	0	2	126	14	sw.	e.
3....	0	1	3	10	10	12	3	6	9	7	2	3	6	10	7	8	14	15	13	14	12	11	10	9	195	18	sw.	s.
4....	7	9	7	5	6	6	11	9	9	10	10	15	14	15	14	14	14	17	14	13	13	13	17	16	278	22	sw.	sw.
5....	12	14	16	14	14	15	15	15	17	16	14	12	9	10	12	9	6	5	3	2	4	4	4	3	245	20	s.	s.
6....	4	3	4	3	2	1	1	0	1	1	1	8	5	6	6	6	4	5	5	8	9	13	8	10	114	15	sw.	s.
7....	9	12	13	17	17	15	14	16	14	12	17	14	21	16	22	23	22	10	10	7	7	6	4	10	328	24	s.	s.
8....	17	21	21	19	22	21	16	16	13	12	10	4	2	2	1	6	3	3	2	2	2	2	1	2	220	24	s.	s.
9....	4	4	1	3	3	3	4	6	7	4	5	4	3*	3*	13*	15*	10*	13*	13	8	5	3	2*	4*	140	28‡	sw.	e-sw.
10....	4	5	4	4	2*	2	1	2	3	2*	2*	6	4	6	11	8	4	4	7	5	7	4	5	4	106	13†	sw.	e.
11....	6	4	4	2	4	9	14	17	12	9	10	9	9	10	8	14	9	9	10	10	9	8	9	10	215	18	s.	s.
12 ..	11	11	15	11	10	6	4	5	8	7	8	9	12	13	5	4	4	6	5	6	5	4	4	4	177	16	s.	s.
13....	5	4	2	3	4	3	3	6	5	4	4	4	7	12	11	11	12	13	14	13	13	12	12	11	188	16	n.	ne.
14....	11	12	12	11	7	12	12	12	15	13	15	13	16	14	13	11	12	15	11	10	9	12	16	11	295	19	n.	n.
15....	10	10	11	8	16	16	12	12	12	16	17	11	13	15	19	19	12	8	10	11	9	7	5	6	285	24	n.	n.
16....	3	5	4	2	2	4	3	3	4	2	2	3	4	3	3	2	4	4	4	4	2	2	2	2	73	6	n.	n.
17....	1	2	3	2	1	1	2	2	4	4	2	4	6	9	17	15	13	16	14	17	16	14	10	18	193	22	n.	n.
18....	20	16	15	24	26	23	12	9	8	6	5	4	9	15	18	16	13	5	7	5	4	5	4	5	274	29	n.	n.-s.
19....	3	8	10	12	16	17	12	17	9	13	24	27	24	21	24	28	27	26	22	20	24	17	20	18	442	30	ne.	ne.
20....	20	20	19	18	22	26	22	26	23	26	24	21	23	20	13	13	14	16	12	9	9	12	13	10	431	30	ne.	ne.
21....	11	10	6	9	8	14	21	21	24	22	21	23	28	26	22	18	18	16	12	18	7	4	3	2	364	30	n.	n.
22....	3	3	3	2	4	2	2	5	7	6	4	5	4	10	10	10	15	17	10	7	7	5	2	2	145	18	n.	n.
23....	2	1	3	3	2	1	3	4	2	4	4	5	5	6	8	8	8	8	15	16	10	5	5	4	132	20	s.	s.
24....	14	21	23	20	21	19	17	21	15	22	18	20	19	17	17	14	16	16	15	16	16	18	8	10	413	28	s.	s.
25....	14	15	12	8	7	7	7	7	6	5	5	5	6	5	6	5	9	10	6	4	4	3	4	3	163	18	s.	s.
26....	1	2	2	2	3	4	3	3	3	9	7	5	7	6	7	4*	4*	4*	5*	6	4	5	7	8	111	18†	s.	s.
27....	5	3	19	18	9	10	10	10	9	5	4	8	11	10	11	10	12	11	7	7	6	10	6	8	219	26	s.	s.
28....	9	9	12	12	10	10	10	11	8	6	7	6	6	5	6	5	5	5	5	5	7	7	7	7	180	14	s.	s.
29....	10	9	11	9	8	10	9	9	10	12	9	8	7	6	6	5	5	4	5	6	5	7	7	7	184	13	s.	s.
30....	9	7	6	6	7	7	7	8	13	9	12	13	14	14	12	11	9	8	7	6	5	3	4	2	199	17	s.	sw.
31....	3	3	3	2	2	3	4	5	6	8	9	9	9	7	9	6	5	6	5	4	5	4	5	4	126	12	sw.	sw.
S'ms.	240	265	276	270	280	291	265	293	286	285	284	290	315	328	349	337	323	310	282	272	244	228	210	218	6731	.....	.....	.....
M'ns.	7.7	8.5	8.9	8.7	9.0	9.4	8.5	9.5	9.2	9.2	9.2	9.4	10.2	10.6	11.3	10.9	10.4	10.0	9.1	8.8	7.9	7.4	6.8	7.0	217.1	.....	.....	.....

* Estimated. ‡ For 20 hours. † For 21½ hours. ° Average hourly velocity, 9.0.

AUGUST.

1....	7	8	5	7	6	5	5	6	3	5	5	4	4	4	4	4	4	3	4	4	4	3	3	4	111	8	sw.	n-ne.
2....	4	2	3	2	3	2	3	3	3	3	3	4	4	4	3	5	4	4	3	2	3	3	5	6	81	7	s.	s.
3....	9	9	7	8	7	7	7	8	10	9	8	9	9	8	8	13	13	10	9	6	6	3	2	2	187	17	sw.	sw.
4....	3	1	2	1	3	4	3	3	2	2	2	3	2	2	2	2	2	3	3	2	2	2	4	4	59	6	nw.	s.
5....	3	3	3	3	3	3	2	3	2	3	3	3	2	3	2	2	2	2	2	3	2	2	2	1	59	4	sw.	Var.
6....	2	2	2	2	2	3	2	2	3	2	3	3	3	3	3	2	2	3	2	1	3	2	2	2	56	4	s.	Var.
7....	3	2	3	3	3	3	5	5	6	7	7	5	4	5	9	7	7	7	5	7	5	6	3	4	121	8	s.	s.
8 ..	3	4	3	2	3	3	3	2	4	3	4	3	3	4	2	3	4	3	4*	4*	3*	2*	3	1	78	6	n.	n.
9....	2	2	3	2	3	2	3	3	5	4	6	5	6	4	4	5	6	4	5	3	2	3	3	4	89	8	nw.	nw.
10....	3	3	3	3	4	3	5	3	4	4	4	2	2	2	4	3	3	2	3	2	3	3	2	2	72	b	nw.	w-n.
11....	2	2	2	3	2	3	3	5	5	5	7	9	7	7	7	9	8	6	6	7	7	7	8	8	135	11	n.	n.
12....	8	9	9	8	9	9	8	8	8	7	5	4	2	2	4	2	2	3	2	2	3	3	2	2	121	11	n.	n.
13....	1	0	2	1	2	1	2	2	3	2	2	3	2	4	3	3	3	3	3	3	3	4	3	3	58	4	sw.	Var.
14....	3	3	3	3	2	3	3	3	3	3	4	3	5	4	4	4	6	4	3	3	3	2	3	4	81	7	sw.	Var.
15....	5	4	4	3	5	2	2	2	3	4	3	3	3	3	4	3	3	3	1	2	2	2	2	3	71	6	sw.	s.
16....	3	2	2	1	2	1	1	1	0	2	3	3	2	3	2	2	2	2	2	2	1	2	1	1	43	3	s.	Var.
17....	1	2	2	2	1	1	2	1	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	40	3	s.	s.
18....	3	3	3	2	3	3	2	4	3	4	5	4	6	5	5	4	6	5	5	4	5	4	3	3	94	6	n.	n.
19....	4	3	3	3	3	3	2	4	2	2	3	3	2	2	2	2	2	2	2	2	1	2	1	0	55	4	se.	se.
20....	1	2	2	2	2	2	1	1	2	0	1	1	2	2	2	3	2*	1	1	1	3	1	0	0	35	3	w.	Var.
21....	1	0	1	1	1*	0	2	1	2	1	1*	1	2	3	2	3	1	2	2	3	2	1	1	2	36	4	e.	Var.
22....	1	0	2	2	2	2	1	3	2	2	2	1	2	2	2	3	3	1	2	1	2	1	2	1	42	3	se.	Var.
23....	2	2	2	1	1	2	2	2	3	2	3	2	2	2	2	2	2	2	2	2	1	2	1	2	46	4	sw.	Var.
24....	1	2	0	2	1	2	3	1	3	2	2	2	3	2	3	3	3	3	3	3	2	2	1	1	50	3	w.	ne.
25....	1	2	0	2	2	1	1	2	2	3	5	3	3	4	5	6	7	5	6	5	5	6	7	6	89	10	sw.	s.
26....	7	9	9	7	6	9	9	7	7	6	7	10	10	8	3	3	6	4	17	17	17	15	14	16	223	20	ne.	s-ne.
27....	18	16	18	18	17	17	18	18	17	17	19	18	16	17	16	17	14	17	16	15	15	15	15	16	400	22	ne.	ne.
28....	15	16	15	14	9	11	13	15	14	14	15	16	18	17	13	14	13	12	12	14	15	14	14	12	335	19	ne.	ne.
29....	12	14	15	14	14	14	12	12	10	9	11	7	9	11	6	5	1	2	1	2	1	2	6	4	194	19	ne.	ne-w.
30....	3	2	5	4	7	4	8	4	3	3	2	3	2	4	5	9	11	7	5	4	5	4	5	3	112	14	w.	w.
31....	3	6	5	4	4	6	8	8	6	7	7	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69‡	10‡	w.	w.
S'ms.	134	135	138	130	132	131	141	142	142	138	153	144	138§	143½	132½	145½	144½	127§	133§	128½	128§	120½	120½	119½	3237†	.....	.....	.....
M'ns.	4.3	4.4	4.5	4.2	4.3	4.2	4.5	4.6	4.6	4.5	4.9	4.6	4.6§	4.8§	4.4§	4.8§	4.8§	4.2§	4.4§	4.3§	4.3§	4.0§	4.0§	4.0§	106.1†	.....	.....	.....

* Estimated. § For 30 days. † For 30½ days. ‡ For 12 hours. Average hourly velocity. 4.4.

This was the first taste of real winter. Lamp was lighted in the house for the first time this evening.[2] This was needed on account of the cloudiness and the fact that the sun disappears behind the mountains in the west and north on Amsterdam Island. Snowfall at 6 p. m. measured .15 inch.

August 28.—Light snow during the preceding night followed by cloudy with brisk northeast wind. Light snow flurries at intervals from 10 a. m. to 2 p. m. Temperature below freezing all day.

August 29.—Cloudy, cold weather with brisk northeast wind in the forenoon, becoming light in the afternoon. Traces of rain and snow at intervals until 2 p. m., the rain freezing as it fell. Heavy snow flurry, 3:30 p. m. to 3:45 p. m., followed by occasional lighter ones. Wind became light and shifted to west about 2:30 p. m. Snow on ground at 6 p. m., 1 inch.

August 30.—Cloudy with occasional snow flurries. Light westerly wind.

August 31.—Snow continued all night with temperature below freezing. Snow 4 inches deep at 7 a. m. Snow flurries at intervals all day with fresh westerly wind. Snowfall for preceding twenty-four hours at 6 p. m., 6 inches; depth on ground, 5 inches.

The expedition departed from Danes Island on September 4, 1906, leaving the instruments in charge of Mr. Felix Riesenberg, who will continue the meteorological observations thruout the year. The meteorograph, however, was brought back to Paris and left with Richard for repairs.

A CLIMATIC SKETCH OF TACOMA, WASH.

By E. B. GITTINGS, Jr., Assistant Observer. Dated Tacoma, Wash., February 27, 1907.

The object of this sketch is to present in popular form as complete a description of the climate of this station as is possible without the introduction of extensive tabular compilations of data. To the ordinary reader nothing can be less interesting than column after column of figures. It is true that these figures are very necessary to the complete understanding of a climate in all its varied phases. Still it is believed that by presenting and briefly describing the most important features to be found in the tables it is possible to convey to most people a much better general knowledge of the climate of a place than they would be able to gain for themselves, even if they were patient enough to delve into the figures.

The records on which this paper is based are those of the Weather Bureau from May 1, 1897 (on which date this station was established) to January 31, 1907, so that while the period covered lacks three months of a full ten years, yet it includes ten Januarys and ten Julys. The subject will be treated under the following heads: Rainfall, temperature, and miscellaneous conditions (including sunshine, cloudiness, etc.).

RAINFALL.[1]

As the rainfall is perhaps the most interesting phase of the climate of this section it will be treated first. Among the important things to know about rainfall are the total amount that falls annually and the distribution of the annual amount among the different seasons, the latter especially when the distribution is very unequal, so that there are a wet season and a dry season, as is the case at this station. Next, considering each season separately, we wish to know, in addition to the seasonal distribution of the total annual rainfall, the following particulars: The period of time over which each season extends, and the greatest number of consecutive rainy days and of days without rain that usually occur in each. Subdividing the seasons into months and considering these separately, it will be of interest to determine the intensity and the probability of rainfall for each month.

As a description of rainfall is incomplete without mention of its special features, attention will also be given to the frequency and intensity of excessive monthly and daily rainfalls, and (since it is not of sufficient importance at this station to be considered separately) some information concerning the snowfall will be given.

Annual and seasonal rainfall.

The average annual rainfall at Tacoma is 45.36 inches, the greatest amount recorded in any one year being 54.67 inches, the least amount 35.58 inches. Of the average annual amount 34.15 inches, or 75.3 per cent., falls from October 1 to April 1, so that the wet season may be said to cover the six months beginning with October and ending with March, the other six being the dry season. The average monthly amounts for the wet season range from 3.30 inches in October and 3.91 inches in March to 8.67 inches in November and 7.08 inches in December; for the dry season the range is from .64 inch in July and .59 inch in August to 2.91 inches in April and 2.52 inches in September. These figures show that the rainfall in November and December is copious and that July and August are almost rainless.

Wet and dry periods.

Defining a rainy day as one on which .01 inch or more of rain falls, we may expect annually 162 rainy days. As a rule, there will be 9 or 10 consecutive rainy days in each month from November to February, inclusive. The longest rainy period on record for the rainy season is 23 days; the longest period without rain in measurable amounts is 15 days. During the dry season there will, as a rule, be only 2 consecutive rainy days in July and August and 4 consecutive rainy days in each of the other four months. The longest rainy period recorded for the dry season is 9 days; the longest period without rain is 39 days.

Intensity and probability of rainfall.

If we divide the average amount of rainfall in inches during any month by the average number of rainy days in the month, we obtain what is known as the average intensity of rainfall in inches for a day in that month. In the wet season the intensity varies from .25 in October and .24 in March to .35 in December and .41 in November. In the dry season the range is from .16 in July and .15 in August to .22 in April and .25 in September, the decimal representing the fraction of an inch in each case.

By dividing the number of rainy days in any month by the number of days in the month we obtain the probability of rainfall for that month. In the wet season the probability exprest in percentage ranges from 42 per cent in October and 52 per cent in March to 65 per cent in December and 70 per cent in November; in the dry season the range is from 13 per cent in July and August to 33 per cent in September and 43 per cent in April.

Excessive rainfalls.

When 10 inches or more of rain falls in a month the rainfall for that month is considered excessive; for 24 hours a fall of 2.50 inches or more is excessive; and for a single hour a fall of 1 inch or more is excessive.

During the past ten years there have been seven months when the rainfall was excessive, five Novembers and two Decembers, the greatest monthly fall on record being 14.48 inches in December, 1897. There have also been five excessive daily rainfalls, the heaviest 24-hour fall being 3.79 inches in November, 1904. A fall of 1 inch in a single hour has never been recorded.

Snowfall.

The average annual snowfall at Tacoma is 15 inches. As a

[2] See footnote [1], under June 21.

[1] Thruout this article whenever the writer uses the expression "rainfall", he evidently includes the amount of melted snow, if any.

rule, most of the snow melts as it falls. No snow has ever been recorded from May to October, inclusive, and only three times in April and five times in November. The average number of days annually on which snow falls is eight, the greatest number in any one year being thirteen, the least, two. The month of maximum snowfall is January, with an average of 6.6 inches. The heaviest fall recorded in twenty-four hours was 8 inches, in January, 1899. The average maximum depth to which snow accumulates on the ground is 5.9 inches. The greatest depth it ever attained was 16 inches, in January, 1899. The greatest number of consecutive days with snowfall in appreciable amount was 4.

General remarks on rainfall.

A few general remarks concerning the rainfall may serve to make this description more complete. The statement that in the winter months periods of ten days' rains are to be expected does not mean that the rainfall during these days is incessant. The fact is that very much of the rainfall is intermittent; periods of several hours at a time when it does not rain are quite frequent even during the wettest periods of the rainy season. Sometimes there is sunshine for an hour or so between showers. The somewhat prevalent notion that the rainy season here is one of an unending downpour is quite erroneous. Another point worthy of notice is that exceedingly heavy showers, such as those that accompany thunderstorms and cloudbursts, are almost unknown here; the fact that an hourly fall of 1 inch has never been recorded bears out this statement.

TEMPERATURE.

In considering the temperature conditions we shall find that there are no well-defined periods separating the seasons from one another; in fact the transition from summer to winter and from winter to summer is so gradual that it is scarcely more noticeable than is the seasonal change from the long days of summer to the short ones of winter.

The mean annual temperature is 50.9°. The mean monthly temperatures have a range of 23.7° from 63.3° for July to 39.6° for January. The extreme monthly range (that is, the difference between the warmest month and the coldest month on record) is 34.4° from 68.0° for July, 1906, to 33.6° for January, 1907. The means of the extreme monthly temperatures are as follows for the months given: July, maximum 88.6°, minimum 47.9°; January, maximum 55.2°, minimum 21.7°. The means of the daily maxima and the daily minima are: for July, maxima 73.2°, minima 53.3°; for January, maxima 44.2°, minima 34.9°. The first group (means of extremes) indicates that at least once in July a maximum of about 88.6° and a minimum of about 47.9° will usually occur; in January a maximum of about 55 2° and a minimum of about 21.7° may be expected. The extreme maximum on record was 98.0° in July, the extreme minimum 9.0° in January, giving a total range of 89.0°. The second group (means of maxima and of minima) shows the means of the daily maxima and of the daily minima for the respective months and it is of more importance from a climatological standpoint, as it shows more nearly what are the usual conditions.

There usually occurs one day each year with a temperature of 90° or over, and with the exception of one period of three successive days, more than one day at a time with a maximum of 90° or over has not been recorded.

In comparing these maximum temperatures with those of continental, or dry and mountainous regions, it must be remembered that a high degree of temperature in this climate will be found very much more oppressive than will the same degree in those regions. This is explained by the fact that the relative humidity at this station is rather high even in summer, so that the so-called sensible temperature, or that actually felt by the human body, is also quite high. The high summer humidity is due to the prevailing northerly winds becoming charged with moisture from the surface of Puget Sound, which extends northward from this station.

The freedom of the winters from long-continued cold spells and from extremely low temperatures is much more noticeable than is the lack of hot weather in summer. In fact it is chiefly to the mildness of the winter season that the equability of temperature at this station is due. The average number of days annually on which the minimum temperature falls below the freezing point is 29, these days usually occurring between November 1 and April 1; and in October about three times in five years, in April about once in three years. The greatest number of successive days ever recorded with minima below freezing is 13.

Frosts.

The average date of the first killing frost in autumn is November 19, the earliest ever recorded occurring October 18. The average date of the last killing frost in spring is April 1, the latest ever recorded occurring April 8.

Daily range and variability.

The mean daily range of temperature varies quite uniformly from 19.9° in July to 9.4° in December and January.

The mean variability, or the change in temperature from one day to the next, ranges from 2.6° in August and September to 3.5° in December, showing that great changes from day to day are remarkably infrequent at all seasons of the year.

SUNSHINE, CLOUDINESS, AND MISCELLANEOUS CONDITIONS.

The average annual sunshine at Tacoma amounts to 40 per cent of the possible. The sunniest year on record was 1898, with 51 per cent; the year of least sunshine was 1903, with 28 per cent. The sunshine is very unequally distributed thruout the year, this distribution following closely the dry and the rainy seasons. The month of maximum sunshine is July, with an average of 63 per cent; that of minimum sunshine, December, with an average of 11 per cent. The sunniest month on record was July, 1906, with a percentage of 84; the month with the least sunshine was November, 1904, with a percentage of 2.

These figures show that in the dry season sunshine is quite plentiful, but in winter the sky is usually overcast. During the five successive months from October to February the average percentage of sunshine for the entire period falls to 23.

The average annual cloudiness is 67 per cent, ranging from 42 per cent in July to 86 per cent in December. For the year there are 72 clear, 101 partly cloudy, and 192 cloudy days; for July, 15 clear, 10 partly cloudy, and 6 cloudy days; for December, 2 clear, 4 partly cloudy, and 25 cloudy days.

There is an annual average of 39 foggy days, 5 of which occur during the dry season and 34 during the rainy season. There has been only one dense fog in July during the ten years covered by the records, while there are, as a rule, 8 foggy days in December.

A light smoke from forest fires usually sets in about the 1st of August, and generally it continues almost unabated, completely obscuring the horizon, until the middle of September or the 1st of October, when the first general rains serve to extinguish the fires. This smoke occasionally becomes so dense as to obscure the sun as effectually as would thick altostratus clouds.

From thunderstorms and violent winds Tacoma is remarkably free. As a rule, there are about three thunderstorms in a year, and most of those that occur are hardly noticeable, it usually being impossible to observe any of the lightning that accompanies them. The highest winds occur during the winter. Most of them are of less intensity than gales and do not do any great damage. The only damaging winds are those from the northerly quarters, which cause considerable trouble to the shipping in the harbor; these northerly blows are very

TABLE 1.—*Monthly rainfall, in inches, at Tacoma, Wash.*

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.
1897...	.....	.....	.....	.....	1.46	1.54	0.87	0.58	1.41	1.63	12.31	14.48	.....
1898...	3.01	8.68	0.97	2.26	1.12	2.41	0.26	0.38	4.24	1.60	5.92	4.73	35.58
1899...	9.17	4.50	3.82	4.58	2.75	1.27	0.21	2.26	1.93	3.23	10.11	7.05	50.88
1900...	4.97	4.66	5.51	1.77	4.62	3.22	0.33	0.84	1.57	6.13	5.23	7.97	46.82
1901...	6.48	6.26	2.97	5.93	2.26	1.46	0.50	0.32	2.42	2.60	9.62	4.63	45.75
1902...	6.21	7.78	5.00	2.96	1.83	1.87	1.91	0.20	2.75	2.88	10.84	10.44	54.67
1903...	8.23	1.35	5.83	3.05	1.69	2.59	0.80	0.75	3.59	2.72	10.00	4.51	45.11
1904...	6.39	7.57	6.08	3.84	1.04	1.36	0.94	0.07	0.40	1.27	11.88	5.07	45.91
1905...	4.93	2.51	3.78	0.71	4.15	3.23	0.34	0.39	2.79	5.50	3.08	8.19	36.60
1906...	5.83	3.95	1.26	1.09	2.90	2.75	0.21	0.08	4.11	5.46	7.74	6.72	42.10
1907...	3.92	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Av'ge.	5.91	5.28	3.91	2.91	2.38	2.17	0.64	0.59	2.52	3.30	8.67	7.08	*45.36

Averages in black figures are from 9 years record. *Sum of monthly averages.

TABLE 2. - *Mean temperature, in degrees F., at Tacoma, Wash.*

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.
1897...	.....	.....	.....	.....	57.2	59.0	61.4	66.2	56.0	50.0	42.9	41.7	.....
1898...	38.4	44.8	42.0	49.2	55.4	60.3	63.8	65.6	59.6	50.6	43.4	38.5	51.0
1899...	40.4	38.0	42.5	47.2	50.6	56.9	64.0	59.6	60.0	50.7	50.9	42.7	50.3
1900...	42.2	41.7	49.0	50.4	55.2	61.4	64.0	61.2	57.2	50.0	42.6	44.2	51.6
1901...	39.3	41.6	44.6	46.4	53.4	56.1	60.8	64.2	56.0	56.0	47.6	40.8	50.6
1902...	38.4	45.2	43.8	48.2	55.5	59.1	62.3	62.9	57.0	53.0	44.4	40.6	50.9
1903...	41.5	38.7	41.6	46.4	53.3	60.8	60.8	62.3	56.7	52.2	45.3	41.0	50.0
1904...	41.0	38.1	41.6	51.3	53.6	58.0	63.2	62.9	60.2	53.6	48.7	42.7	51.2
1905...	39.3	42.2	48.6	51.3	54.1	59.0	64.8	62.6	59.4	47.4	43.8	40.7	51.1
1906...	41.4	42.7	44.2	52.0	54.2	57.8	68.0	64.1	58.6	53.0	44.2	41.8	51.8
1907...	33.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Av'ge.	39.6	41.4	44.2	49.2	54.2	58.8	63.3	63.2	58.1	51.6	45.4	41.5	50.9

Averages in black figures are from 9 years record.

TABLE 3.—*Average cloudiness, percentage, at Tacoma, Wash.*

Date.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Ann'l.
1897...	.....	.....	.....	.....	54	74	41	27	58	65	90	87	.....
1898...	80	80	56	58	45	50	31	43	50	60	80	74	59
1899...	90	81	67	71	76	57	36	69	43	74	87	90	70
1900...	79	80	71	65	70	63	36	58	60	75	75	88	69
1901...	78	60	71	64	63	70	43	37	52	69	83	86	65
1902...	78	83	77	72	73	56	55	37	53	79	94	98	71
1903...	95	68	73	74	75	74	56	67	71	62	91	83	74
1904...	85	88	66	60	52	46	51	50	49	72	86	82	66
1905...	70	56	69	52	70	66	44	54	74	69	72	89	65
1906...	94	76	71	65	74	66	39	42	59	68	83	81	67
1907...	67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Av'ge.	82	75	69	65	65	62	42	48	57	69	84	86	67

Averages in black figures are from 9 years record.

TABLE 4.—*Prevailing wind directions and average hourly velocities at Tacoma, Wash.*

Date.	Jan.		Feb.		Mar.		April.		May.		June.		July.	
1897...	.....	.....	.....	.....	.....	.....	.....	.....	*	*	sw.	6.0	sw.	6.4
1898...	sw.	5.8	sw.	7.6	sw.	7.2	n.	5.8	sw.	6.5	n.	5.6	n.	5.7
1899...	sw.	7.1	sw.	8.9	sw.	8.3	sw.	8.4	sw.	5.6	sw.	6.6	n.	5.4
1900...	sw.	5.4	sw.	6.7	sw.	5.5	n.	5.6	sw.	6.0	n.	5.9	n.	5.3
1901...	s.	6.2	s.	7.8	sw.	6.9	n.	6.6	sw.	5.4	sw.	6.7	n.	5.4
1902...	s.	5.2	sw.	6.0	sw.	7.7	sw.	6.2	sw.	6.2	n.	5.8	n.	6.1
1903...	sw.	6.7	s.	4.5	n.	7.4	sw.	6.6	sw.	6.3	n.	5.2	n.	5.4
1904...	sw.	7.1	sw.	8.1	sw.	8.3	sw.	5.8	n.	5.8	n.	6.3	n.	6.1
1905...	sw.	4.9	n.	5.9	n.	6.5	n.	6.1	sw.	6.7	sw.	5.2	n.	4.8
1906...	sw.	6.2	sw.	4.6	n.	6.9	n.	5.2	sw.	5.7	sw.	6.4	n.	5.1
1907...	sw.	7.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	sw.	6.2	sw.	6.7	sw.	7.2	n.	6.3	sw.	6.0	n-sw.	6.0	n.	5.6

Date.	Aug.		Sept.		Oct.		Nov.		Dec.		Annual.	
1897...	n.	4.8	n.	4.2	n.	4.1	sw.	7.1	sw.	6.4	.....	.....
1898...	n.	4.3	n.	5.3	sw.	5.4	sw.	7.2	sw.	5.2	sw.	6.0
1899.....	sw.	5.4	n.	4.0	sw.	5.5	s.	5.0	sw.	6.5	sw.	6.4
1900...	sw.	5.2	n.	4.6	sw.	6.3	sw.	6.1	s.	6.2	sw.	5.7
1901.....	n.	4.4	n.	5.1	sw.	4.4	sw.	5.8	sw.	6.8	sw.	5.9
1902.....	n.	4.9	n.	5.4	sw.	3.5	sw.	7.2	sw.	6.7	sw.	5.9
1903.....	n.	4.5	n.	5.8	n.	5.1	sw.	6.2	sw.	4.2	n.	5.7
1904.....	n.	4.1	n.	4.0	n.	4.5	sw.	5.9	sw.	6.6	sw.	6.0
1905.....	n.	5.4	sw.	5.9	n.	5.8	sw.	4.5	sw.	5.7	sw.	5.6
1906.....	n.	4.4	n.	5.2	sw.	6.3	sw.	6.1	sw.	5.7	n.	5.6
1907.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	n.	4.7	n.	5.0	sw.	5.1	sw.	6.1	sw.	6.0	sw.	5.9

Averages in black figures are from 9 years record. * No record for May, 1897.

infrequent, however. By far the greater number of high winds come from the southerly directions. The number of gales (winds of 40 miles or over per hour that continue for periods of at least five minutes) is usually about two in three years. The highest wind velocity ever recorded at this station was 46 miles per hour from the southwest.

TABLES.

For the benefit of those who desire more detailed information than that given above, the preceding tables, showing the monthly rainfall, temperature, cloudiness, and the average hourly velocity and prevailing direction of the wind for the same period have been compiled.

SNOW ROLLERS AT CANTON, N. Y.

By M. L. FULLER, Observer. Dated Canton, N. Y., March 30, 1907.

I send a few notes relative to the formation of snow rollers in the village of Canton on February 19, 1907.

The conditions attending the formation of the rollers were as follows: Upon a dry and evenly distributed snow covering of 4 inches depth there fell late in the forenoon of the 19th a half inch or more of fine, dry snow. After 1 p. m. the falling snowflakes were of greater size, becoming large, moist, and feathery after 3:25 p. m. and continuing to 4:25, by which time a total of about one inch had fallen. Light snow, with about one-tenth inch of dry sleet, occurred from 4:25 to 6:55 p. m.

The temperature, from 10° F. at the 8 a. m. observation, increased to 17° by 3:15 p. m., then rose suddenly to 31° at 3:30, and slowly to 34° by shortly after 6 p. m., from which maximum it fell to 17° by 7:15 p. m.

This abrupt rise of temperature and brief thaw accompanied a southwest wind with a velocity of 30 to 40 miles per hour that burst suddenly upon this locality at 3:25 p. m., displacing the northeasterly winds of 4 to 12 miles of the morning and midday, which had continued practically up to that hour.

Tho the formation of the rollers was not witnessed, so far as ascertained, it is known to have occurred in the late afternoon or early evening, probably between 5 and 6 p. m. Small rollers were found next morning in a variety of locations. The largest had been developed on a sloping lawn where the strong wind, striking the exposed side of a large cottage, had swept downward and away, rolling the snow downhill. Here the largest attained diameters and lengths of 10 to 12 inches. In structure they closely resembled rolls of cotton batting, but the centers were almost invariably shorter than the outer layers. The layers were plainly marked and varied somewhat in thickness, averaging probably three-fourths of an inch or more and being usually thinner near the axis. In occasional instances the centers were very short or almost wanting; and the rolls, altho firm enough next morning to be handled, were much lighter than snowballs of the same size when rolled by hand, thus indicating but slight packing of the snow in the wind rollers.

From the conditions observed in this instance it would appear that the flakes of a light, fluffy layer of surface snow are made adhesive by a sudden rise in air temperature while the under snow still remains cold and dry, and the particles of damp surface snow are enabled to adhere to each other but not to the dry under snow. A strong wind may then push over little prominences or projections of the surface snow and start them rolling, when of course they will continue to travel and grow until the resistances overcome the propelling power of the wind.

The accompanying photographs [see figs. 1 and 2] of the Canton rollers were taken by Mr. Ford Moran, of the class in climatology at St. Lawrence University.

Another member of the class in climatology, Miss Ione A. Jillson, subsequently reported having once witnessed the formation of snow rollers, and at the suggestion of the writer

contributes the following account. As its author appears to be habitually careful and painstaking in both observation and statement, the description is thought to be of value:

FIG. 1.—Snow rollers at Canton, N. Y., February 20, 1907.

FIG. 2.—Snow rollers at Canton, N. Y., February 20, 1907.

During the winter of 1895 I watched the formation and progress of so-called snow rollers. The temperature was probably a trifle above the freezing point, following a snowstorm characterized by very large, light flakes. For the most part the wind seemed to sweep downward and get under a slightly projecting mass of snow and set it in motion. As the roll grew in size the speed, at first very rapid, slackened until the mass became too compact and heavy to be moved farther. Sometimes a triangular shaped "card" of snow, often three or four inches across the base, would rise and fall several times before the wind gained sufficient purchase to turn the point over and start the roller. This card lookt very much like the corner of a piece of paper as it rises and falls with the wind just before it is blown away. The snow seemed to be of an unusual consistency, rendering it tough and flexible.

These rollers were observed at Edenton, St. Lawrence County, N. Y.

E. SCHARF ON THE EFFECTS OF HAIL ON CROPS[1]

Insurance against damage to growing crops by hail is practised quite extensively in Europe, chiefly by small local associations on the mutual plan. It is to aid in the adjustment of claims under this form of insurance that the present work appears to have been written.

The author begins by defining the three varieties of hail commonly recognized in his section of Germany, viz, "Graupel", the small, opaque, snowy hail of cold weather; "Schlossen", an intermediate form; and "Hagel", or true hail, the frequent accompaniment of summer thunderstorms. Well known facts regarding the distribution of hailstorms in space and time are also summarized.

The bulk of the work, however, is an original study, in great detail, of the effects of hail upon each of the ordinary field crops; these vary with the severity of the storm, with the stage of the crop's growth. and even with the character of the soil and the amount of fertilization, as influencing the vigor of the plants and their ability to withstand the blows of the hailstones. Numerous drawings and photographs make clear the characteristic effects of a hailstorm, and aid one to distinguish these effects from the ravages of wind, insects, and disease.

We believe this is the first treatise of its kind. It should be within the reach of anyone who is interested in hail insurance, whether as an underwriter or a policy holder.—*C. F. T.*

LONG-RANGE INDIAN MONSOON FORECASTS.

The annual publication by the director of the Meteorological Service of India of a statement of general atmospheric conditions, with an attempt to forecast the general character of the southwest monsoon rainfall, has now proceeded for about twenty years with a variable degree of success, but sufficient to show that the effort at long-range forecasting is really worth while. The work was begun by Blanford, was carried on by Sir John Eliot, and is now in the hands of his successor, Gilbert T. Walker. Pending a more extensive investigation into the philosophy of these seasonal forecasts we quote the following remarks from a review of the subject by Professor Hann, of Vienna, as published in the Meteorologische Zeitschrift for February, 1907.

Blanford thought that he had shown that generally snowfall in the regions to the north and west of India produced an abnormal distribution of pressure over northern India that was unfavorable to the advance of the southwest monsoons over this region; and he adopted the general principle that lower atmospheric pressure over any area increased the amount of its rainfall.

Sir John Eliot showed that the conditions over India alone would not suffice to justify reliable forecasts, and after the year 1894 information as to the conditions over the Indian Ocean was made use of, extending annually farther south, until, in 1897, even Africa and Australia were considered. It seemed most probable that heavier rainfall at Zanzibar and off the Seychelles in May would justify predicting heavier rainfall in India later in the season, when the monsoon has crost over the equator. But later experience showed that the opposite was the case. Then it was assumed that perhaps an abnor-

[1] Scharf, Edmund. Der Hagel. Erkennung, Beschreibung, Beurteilung und Schätzung von Hagelschäden. Halle a. S.: Im Selbstverlage des Verfassers. 1906. vi, 195 p. 12°.

mal high pressure over Mauritius would increase the monsoon current and the Indian rainfall; but this did not prove to be the case. The relations between rainfall in India and atmospheric pressure over India, Siberia, the Indian Ocean, and South America are such that in years of excessive monsoon rainfall in India the atmospheric pressure over South America is too high, and conversely, small rainfall in India goes with low pressure in South America. Moreover in many years the low pressure occurs earlier in South America than the small rainfall in India. A table of snowfall for fifteen years shows that in the case of heavy and late snowfalls, when the area in the Indian highlands covered with snow in May is larger than usual, it argues for small rainfall in June.

Thirteen years of records show that heavy rainfall in the subequatorial region, over Zanzibar and the Seychelles, brings deficient rainfall in India over both branches of the monsoon; so that in general the snowfall in upper India is not connected primarily with the subsequent defect in rainfall, but is only an indication of a disturbance in the general circulation of the atmosphere. Moreover excessive rainfall at Zanzibar in April and May coincides with deficient height of the flood wave in the Nile River; so that we may say that a deficient snowfall in upper India coincides with a deficient flood in the Nile. On the other hand heavy snowfall in India and heavy rainfall in the equatorial region is paralleled by the connection between abnormal rainfall at Zanzibar and the Seychelles in November, with heavy snowfall in upper India in the subsequent cold season.

With regard to atmospheric pressure and rainfall high pressure in Mauritius means small rainfall in India, and low pressure in Mauritius is followed by heavy rainfall in India, in a large majority of cases, namely, 80 per cent. Comparing pressures in Argentina with rainfall in India, Walker and Hann are led to the remarkable result that positive departures of pressure in the spring at Cordoba are followed by positive departures of the next following summer rainfall in India. The worst drought in India, with a rainfall departure of —24 per cent, or 254 millimeters, was preceded by a departure of —1.4 millimeters of barometric pressure at Cordoba; whereas the best monsoon rainfall, 1892, with a departure of +124 millimeters, was preceded by +1.8 millimeters of pressure departure at Cordoba. According to the last memorandum by G. T. Walker, large departures of pressure in July at Mauritius have a close connection with the simultaneous opposite departures of rainfall in August and September over the whole of India.

In conclusion Hann says that the method by which Walker has carried out his investigation seems to be the most appropriate, namely, the comparison of the departures of the meteorological elements. We must know both the direction and the quantity of the departures. We must compare them geographically as well as chronologically. The best example of such work consists in Hann's study of the anomalies of the weather in Iceland as compared with those on the continent of Europe.

LONG-RANGE SEASONAL FORECASTS FOR SOUTH AFRICA.

Mr. D. E. Hutchins, conservator of forests for South Africa, read a paper before the South African Philosophical Society, at Cape Town, November 29, 1905, entitled "The cycle year 1905 and the coming season". An abstract, furnished by Mr. Hutchins, occupies pages 98–105 of the Agricultural Journal of the Cape of Good Hope for January, 1906, Volume 28, No. 1. The author has made an elaborate study of the rainfall data published regularly in the Agricultural Journal by Mr. Charles M. Stewart, Secretary to the Meteorological Commission of Cape Colony; and while his first thought has been to work out chronological cycles in South African rain, he has also lookt for geographical relations, namely, the relations between the rains of South Africa and those of the states to the north of it, as well as of more distant countries. The first publication of Mr. Hutchins that we find mentioned is one of 1888, entitled "Cycles of Drought and Good Seasons in South Africa". For the present paper of November, 1905, he prepared diagrams of the rainfall records at Cape Town, Grahamstown, and Durban, which accord remarkably with the three cycles that he has worked out for Cape Colony weather. These cycles he designates as follows (see Table 1):

(1) The "solar cycle" of 11.11 years, whose maximum occurred in 1905, and which happened that year to agree with the maximum of sun spots, but does not always do so; three of these solar cycles, or the 35-year sun-spot cycle, he calls the "Brueckner cycle".

(2) A cycle of alternating periods of nine and ten years, or an average of nine and a half years; this he terms the "storm cycle"; its maximum will occur in 1907; it has its greatest influence on the winter rainfall of the western portion of South Africa, while in the eastern portion it is liable to bring only wind. This also corresponds to the mean period between successive droughts in Australia.

(3) A cycle with alternating periods of twelve and thirteen years, or an average period of twelve and a half years; this he terms the "Meldrum cycle", in compliment to that eminent meteorologist; this cycle brings a good deal of general rain, but usually especially affects the summer rainfall of the eastern districts of South Africa.

TABLE 1.— *Dates of cycles.*

Solar cycle, 11.11 years.	Brueckner cycle, 35 yrs.	Storm cycle, 9.5 years.	Meldrum cycle, 12.5 yrs.	Wolfer's sun-spot numbers.	
Maxima.	*Maxima.*	*Maxima.*	*Maxima.*	*Maxima.*	*Minima.*
1816.62		1813.0		1816.4	
			1818.0		1823.3
1827.73		1822.5		1829.9	
			1830.5		1833.9
	1835.5	1832.0		1837.2	
1838.84		1841.5	1843.0		1843.5
1849.95				1848.1	
		1851.0	1855.5		1856.0
1861.06		1860.5		1860.1	
			1868.0		1867.2
	1870.5	1869.5		1870.6	
1872.17					
		1879.0	1880.5		1878.9
1883.28				1883.9	
		1888.5			1889.6
			1893.0		
1894.39				1894.1	
		1898.0			1902.0
1905.50	1905.5		1905.5	1905.5	
		1907.5			

These three cape weather cycles were recognized by Mr. Hutchins in 1888. By means of them the rainfall of that year was predicted, and he states that they have agreed with the rainfall of subsequent years, with but few failures. As we have not the rainfall data at hand we can only quote Mr. Hutchins's statement that, during the period 1841–1905 at Cape Town, the Meldrum cycle has failed once and been one year late three times. During the period 1865–1905 the storm cycle has failed three times out of four at eastern stations, and has sometimes been late; but at Grahamstown itself only one failure and one lateness have occurred. At Durban, however, the storm cycle has failed twice, and the rains came late five times during the period 1866–1905. After a detailed consideration of the rainfall for each year from 1865 to 1905, given on pages 104, 105, he states the following conclusions: (1) The three main weather cycles are of general application thruout South Africa, and the storm cycle and Meldrum cycle are of general application east and west beyond their areas of greatest influence. (2) As we go northward the heavier rainfall occurs

a season earlier. (3) There are obscure indications of a tendency to rain at the sun-spot minimum, but the normal minima (he uses 1844–1855–1867–1878–1889–1900) have so frequently coincided with the other cycles that the exact influence of the sun-spot minimum is difficult to trace, and further observations are necessary. (4) Up to the present time the direct influence of Brueckner's 35-year cycle is inappreciable in South African weather.

In conclusion, Hutchins offers a forecast as to the rainfall. In 1888 he published a forecast for the year 1905, namely, that the sun-spot cycle and the Meldrum cycle would coincide, and therefore "most probably general good rains". For 1906 his prediction then was: "Probably good rains, with drought at a few stations". He claims that the forecast for 1905 was well verified, and now, namely, in November, 1905, after studying recent conditions, he offers the following forecast for the next two years:

> For South Africa generally, except the southern and southwest coast of Cape Colony [all which is included in his summer rainfall area], the year 1906, coming between two rainfall periods, may have short and local droughts, or the rains may run on to the heavy rainfall period which is ahead of us in 1907, and probably in 1908; the outlook now is for several years of good rainfall ahead.
>
> For the south and southwest coasts of Cape Colony strong "southeasters", really southerly and southwesterly winds, may be expected during the summer; the cyclical indication for next winter's rains (1907) is that they will be moderate.
>
> Long-period forecasts can not have anything like the precision of the short, day-or-two forecasts; * * * they are at best but a calculation of probabilities and an indication of what may be expected to affect the coming season as a whole. * * * For the drier inland districts the rains are too irregular for the cyclical forecast to have any practical value. After 1908 there are six years of drought to be looked forward to, with an irregular mitigation of the drought, most probably about 1911 or 1912.

The more we consider the statements contained in Mr. Hutchins's abstract, the more certain does it seem that he has shown that sun-spot cycles have nothing to do with the variations of rainfall in South Africa. On the other hand, he has shown that there are certain correlations between the rainfall in the east and the west, such that when the one goes up the other goes down. He finds so many exceptions to the chronological regularity of heavy and light rains that the probability is that there is no such regularity at all, so that cycles of 12.5, 11.11, 35, and 9.5 years, all of which he investigates, have no real existence. But, on the other hand, the fact that the area of heavy rain, with its outlying region of lighter rains, moves about, east and west, north and south, becomes clearly evident. When this geographical motion is large one is tempted to hunt for a cycle to correspond, but nothing of the kind appears from his data. On the contrary, by studying the monsoon data of the east coast of Africa it is plain that, as he himself says, "the rains are too irregular for the cyclical forecast to have any value".—*C. A.*

WILHELM VON BEZOLD.

This eminent meteorologist was born at Munich on the 21st of June, 1837, and died at Charlottenburg, near Berlin, on the 17th of February, 1907. After twenty years of service in the University of Munich, where he organized the Bavarian Meteorological Service, he was called to be Director of the Royal Meteorological Institute at Berlin, in 1885, where he was made professor in the university, a member of the Royal Academy of Sciences, and one of the curators of the Imperial Physico-Technical Institute, and where also he attained the rank of Royal Privy Councilor.

Von Bezold's contributions to the study of the thermodynamics of the atmosphere have been of the highest importance. Fortunately all of these memoirs were revised and edited by himself in a volume of collected memoirs published in 1906. The first three out of the five have also been translated and published by the Smithsonian Institution, so that they are as well known outside of Germany as inside. His first meteorological memoir was that of 1864 on observations and theory of the twilight, a memoir that became widely known as soon as the red twilights of the Krakatoa eruption revived our interest in the subject. His last meteorological memoir on climatological averages for complete circles in latitude brings us to the summit of our present knowledge of the general relation between the temperature of the earth and the heat that it receives from the sun.

Not only meteorology but equally terrestrial magnetism attracted his attention and became illumined by his thought, and his most eminent pupil in this line of research, Dr. L. A. Bauer, is now carrying out, with the help of the Carnegie Institution of Washington, those broad researches that von Bezold initiated. Von Bezold's principal memoirs on this subject have been published since 1895, but it had been treated of in university lectures for many years before. Many of his devoted students and admirers have lately combined to publish a memorial volume in which they will doubtless work out many of the ideas that he so freely suggested as topics for further research.—*C. A.*

A WINTER WATERSPOUT.

By DAVID CUTHBERTSON, Local Forecaster. Dated Buffalo, N. Y., February 25, 1907.

An unusual phenomenon was observed by the office force at the Buffalo station and a few visitors to the office on the afternoon of Monday, February 11, 1907, when a well-defined funnel-shaped cloud formed over this end of Lake Erie. It was first observed near the extreme western limit of the open water, about a quarter of a mile west of the outer lighthouse. (See fig 1.) This lighthouse is located midway between the American and Canadian shores where the lake begins to narrow into the Niagara River, and on account of the strong current ice seldom forms within one-sixth of a mile of the lighthouse on either side. This open water usually extends from a quarter to a half mile southwestward up the lake, converging to a V-shape at the southwestern end. At about 2:40 p. m. a well-defined tornado-like column formed near the extreme limit of the open water. The column in its early stages seemed to waver with the force of the wind for a few minutes, having all the appearance of the great waves of steam or fog, with a rolling motion against the wind. Suddenly, about 2:45 p. m., the cloud straightened up, the top having an altitude of about 100 feet, and started southwestward across the ice fields toward the south shore. The cloud had all the characteristics of a well-defined tornado funnel, or waterspout, appearing to be from 30 to 50 feet in diameter at the base and spread out to about 100 feet at the top. It retained its funnel shape as it advanced over the ice, licking up the snow as it went, until about a quarter of a mile off the south shore, when it began to waver and slowly vanish, breaking away at the bottom first. The wind at the time was blowing at the rate of 36 miles an hour from the northwest, driving a current of air with a temperature of 2° directly across the open water, whose temperature was about 34°, and into the center of the "V". The violent rotary motion is believed to have been due to this cold current driving against a body of relatively warm air over the open water, which was also forced up into the apex of the "V", and having an expansive upward tendency, mixt with the cold current in such a way as to produce the funnel cloud. From information at hand, a well-marked track over the ice fields was left clear of snow.

Two similar clouds were observed about two and a half miles up the lake at about the same time. These, however, appeared to have only the wave-like motion, and did not form an upright column.

During the afternoon a narrow band of strato-cumulus clouds, about 45° wide, extended from northeast to southwest over this

end of the lake. On the western side of these and near the horizon cirro-stratus and alto-stratus clouds prevailed. These phenomena probably would not have been observed had not the men been admiring a beautiful sundog visible at the time.

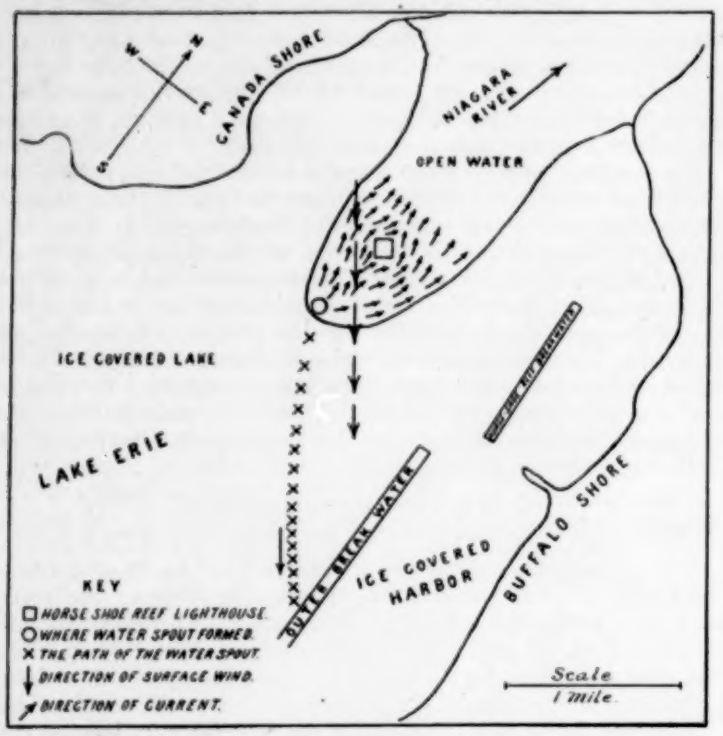


FIG. 1.—Location of waterspout off Buffalo, N. Y., February 11, 1907.

INTERNATIONAL METEOROLOGY.

REPORT ON THE PROCEEDINGS OF THE INNSBRUCK CONFERENCE.

The elaborate report on the proceedings of the International Meteorological Conference of Directors, held at Innsbruck in September, 1905, has been published by the Centralanstalt at Vienna, as an appendix to its annual for 1905. The report consists of three parts—the provisional program, the daily proceedings, and the reports of subcommittees—and an appendix of 90 pages containing articles contributed by over thirty meteorologists. The entire volume is one of the most important of the international meteorological publications. On page 44 the subcommittee on the international meteorological codex reported that this important work was practically finished, and exprest the hope that it would be published in English, German, and French.

The same committee also reported that the international comparison of normal barometers, namely one or two for each national service, is still in the most unsatisfactory condition, and should be undertaken at once; and in accordance with information received by the committee it recommended that the central offices at Berlin, London, Paris, St. Petersburg, and Vienna should prosecute the work. Since the meeting of this committee at Innsbruck Professor Sundell has published the results of his elaborate and successful personal work on this subject since 1885, and has shown that the international comparisons are now practicable at less expense and with greater accuracy than at any time previously. The extensive work done by Dr. Frank Waldo, who at that time compared Washington, Cambridge, Toronto, Kew, Hamburg, St. Petersburg, Berlin, and Paris, can now be repeated with greater advantage. This is, in fact, a work that can no longer be delayed if we would secure for barometry the international accuracy demanded by the progress of meteorology.

The subcommittee on clouds presented a series of revised definitions of cloud names, (*stratus, lenticularis*, etc.), and recommended the publication of additional charts in the new edition of the international cloud atlas.

The conference resolved that hereafter the international committee should consist only of the directors of services. Accordingly its present membership is as follows: Chaves, Davis, Eliot, Hellmann, Hepites, Hildebrandsson, Lancaster, Mascart, Mohn, Moore, Nakamura, Palazzo, Paulsen, Pernter, Russel, Rykatchew, and Shaw. At the first session of the new committee, held on September 14, Mascart was chosen president, and Hildebrandsson secretary.

INTERNATIONAL METEOROLOGICAL CODEX.

This publication, referred to above as having been presented to the Innsbruck meeting, has been published in German by the Meteorological Office at Berlin. It contains viii + 81 pages, and a chart showing the international form for monthly and annual results for stations of the second order. Its contents may be divided into: (1) historical, followed by (2) the resolutions that are now in force or important relative to the general conduct of meteorological observations, computations, and publications; these are a codification of the results of all the international conferences, from that at Leipzic, 1872, to that at Innsbruck, 1905, and the English edition will be as desirable as the German; (3) the twenty pages of index constitute virtually an index to the contents of all the appendices of all the successive international reports. We undoubtedly owe this to Dr. G. Hellmann, whose high appreciation of the importance of bibliography is shown by the resolution offered by him at the conference at Rome, urging the need of a catalog of published observations and a catalog of published memoirs bearing on meteorology. In response to this international wish the German bibliography by Hellmann has already been published, but the general bibliography undertaken by the Weather Bureau is still unpublished. The international meteorological tables were published in Paris in 1890.

This codex will save a great deal of labor and uncertainty in hunting thru the seventeen or eighteen volumes of international reports, and it is to be hoped that the English, French, and Spanish editions will be able to reproduce exactly some of the more difficult passages in the authoritative German, especially the definitions of phenomena, such as halos, *rauhfrost*, and *glatteis*, about which there seems to have been much confusion in the past.—*C. A.*

RAINFALL AND OUTFLOW ABOVE BOHIO, IN THE VALLEY OF THE CHAGRES.

By Gen. HENRY L. ABBOT, U. S. A., retired. Dated Washington, D. C., April 9, 1907.

The exceptional uniformity both as to temperature and rainfall existing in this tropical valley, and the entire absence of frost and snow, render a study of the ratio between downfall and drainage much more simple than in the Temperate Zone. The subject has an important bearing upon certain engineering problems of the Canal, and received early attention from the New Panama Canal Company. The preliminary results appeared in the MONTHLY WEATHER REVIEW for June, 1900,[1] and in the number for February, 1904,[1] a full summary of six years' observations was given. The records have been continued since the work past under the control of the United States—that is to say, to the beginning of the current year, thus adding three more years to the accumulated data. The important bearing of the subject upon many economical questions now receiving attention in this country, such as irrigation, the water supply of cities, generation of power, etc., may render a brief summary of the results of these nine years' investigations interesting to hydraulic engineers. The methods employed were identical thruout, and were so fully explained in the paper in the MONTHLY WEATHER REVIEW for February, 1904, that a tabular statement will suffice to bring the matter up to date (see Table 1).

[1] Vol. XXVIII, p. 243, and Vol. XXXII, p. 57.

It will be noticed that the 6-year, 3-year, and 9-year series accord perfectly in indicating a progressive change in the ratio due to variation in ground-water flow from month to month, and that the multiplication of data has the usual effect of smoothing irregularities in the curve. All three agree in showing the high annual ratio of 65 per cent. It need hardly be stated that the values are found not by averaging the ratios but by computation from the means of the sums of the quantities involved (rainfall and outflow), due weight being given to the number of days per month. Additional interest is given by the fact that the region is densely forested, and thus in a natural condition.

TABLE 1.—*Rainfall and outflow in the Valley of the Chagres above Bohio, 700 square miles.*

Months.	Mean depth of rainfall in millimeters.			Mean outflow in cubic meters per second.			Ratio.*		
	6 years.	3 years.	9 years.	6 years.	3 years.	9 years.	6 years.	3 years.	9 years.
January	147	106	133	122.5	76.8	100.6	1.18	1.07	1.12
February	27	20	25	40.5	39.6	40.2	2.00	2.64	2.15
March	34	27	32	25.7	26.4	25.9	1.11	1.44	1.20
April	75	155	103	33.5	49.7	38.9	0.64	0.46	0.54
May	266	319	284	57.6	73.6	62.9	0.32	0.34	0.33
June	270	286	275	84.3	90.9	86.5	0.44	0.45	0.45
July	394	319	369	124.5	113.6	120.9	0.46	0.53	0.48
August	361	341	354	139.9	120.1	132.7	0.58	0.52	0.55
September	291	285	289	140.3	142.4	134.3	0.65	0.71	0.66
October	361	277	333	164.3	145.6	158.1	0.68	0.78	0.70
November	432	412	425	226.5	193.5	215.5	0.75	0.67	0.72
December	176	220	191	133.5	182.0	149.7	1.14	1.22	1.16
Year	2834	2767	2812	106.8	104.5	106.0	0.65	0.65	0.65
3 dry months	136	202	158	33.2	38.6	35.0	1.05	0.82	0.95
9 rainy mos	2698	2565	2654	131.4	126.5	129.8	0.63	0.63	0.63

*See Monthly Weather Review, February, 1904, Vol. XXXII, pp. 60–63.

TABLE 2.—*Disposition of rainfall above Bohio (based on records for nine years, 1898–1906).*

Months.	Mean rainfall in inches.	Mean outflow in feet-seconds.			Mean outflow in inch-miles.			Evaporation in inch-miles.
		Total.	Direct flow.	Ground water.	Total.	Direct flow.	Ground water.	
January	5.24	3552	951	2603	5.86	1.57	4.29	Negative.
February	0.99	1420	20	1400	2.11	0.03	2.08	Negative.
March	1.26	915	23	892	1.51	0.03	1.48	Negative.
April	4.06	1374	763	611	2.19	1.22	0.97	1.87
May	11.19	2222	2020	202	3.65	3.32	0.33	7.54
June	10.84	3055	2037	1018	4.87	3.25	1.62	5.97
July	14.54	4269	2668	1601	7.03	4.39	2.64	7.51
August	13.95	4687	2556	2131	7.73	4.21	3.52	6.22
September	11.39	4743	2157	2586	7.57	3.44	4.13	3.82
October	13.12	5585	2393	3192	9.20	3.94	5.26	3.92
November	16.74	7613	3172	4441	12.13	5.05	7.08	4.61
December	7.52	5288	1368	3920	8.70	2.25	6.45	Negative.
Year	110.84	3727	1677	2050	72.55	32.70	39.85	38.29
3 dry mos	6.31	1236	269	967	5.81	1.28	4.53	0.50
9 rainy mos	104.53	4557	2147	2410	66.74	31.42	35.32	37.79

These statistics throw an interesting light upon the ultimate disposal of rainfall in this basin. It was shown in the former paper, based on six years' records, that the ratio in five subdivisions for the minimum month, that of May, was 0.30 ± 0.03. This figure is confirmed by the three additional years now available, for which it was 0.34. Since May is at the end of the long, dry season, it is fair to assume that in it the flow of ground water has practically ceased. If so, the ground flow during each month of the year may be computed from the above data, since it is equal to the measured monthly flow less the product of this quantity by the quotient of 0.30 divided by the observed monthly value of the ratio. The accompanying Table 2 exhibits the result of such a computation in the seventh and eighth columns. The figures are given in English units, and in a form directly comparable with the rainfall. This comparison between direct and ground-water flow will be found interesting; the latter curve passes thru a minimum in May and a maximum in November, and its progressive character conforms to what might be expected from gradual seepage thru the earth under the rainfall conditions; the curve of direct flow has also a natural form, and indicates that without the ground flow the river would run nearly or quite dry in February and March, as do now most of its smaller tributaries.

Classing as evaporation the difference between rainfall and total river flow, the values may be expected to vary considerably from month to month; but the mean for the year, representing a complete cycle, should show a value approximately correct. This value is shown to be 38.29 inches, or about one-tenth of an inch per twenty-four hours. Direct measurements by the pan method have very recently been inaugurated on the Isthmus. They show for December, 1906, 0.135 inch per twenty-four hours; for January, 1907, 0.167 inch, and for February, 0.181 inch.

PANAMA RAINFALL.

By E. B. GARRIOTT, Professor of Meteorology.

Like other tropical regions that are swept by winds from the ocean, the Panama Canal Zone, in latitude about 9° north, has fairly well-defined wet and dry seasons. The wet season extends from April or May to November or December, and is called the *invierno;* the dry season extends from December to April, and is called the *verano.* In August there is in Central America an interval of comparatively dry weather that is called the *veranillo,* or *little verano,* or the *verano de Augusto.*

The rains of the wet season come in the form of local thunderstorms that are often torrential in character. In April and May they are usually confined to the late hours of the afternoon; they increase in duration and intensity until in June they often continue during the afternoon and night; they then decrease until August, after which they increase until the approach of the second maximum period of October or November, and then decrease until December.

The immediate cause of the rains of the wet season is found in the shifting of the equatorial rain belt that attends the sun in its annual march north of the equator, and the periods of maximum rainfall occur about the time the sun is in the zenith of Panama, the spring maximum attending the northward movement of the rain belt, and the autumn maximum its return southward movement. During the August interval of comparatively settled weather, which is more marked on the coast than in the interior, the equatorial rain belt is north of Panama.

The annual rainfall is much heavier on the Atlantic than on the Pacific side of the Canal Zone, the amount being about 157 inches at Colon (Aspinwall), and about 67 inches at Panama. At Gamboa, on the watershed at an elevation of about 102 feet, the annual rainfall is a little less than 100 inches. Rains that occur during the dry season are infrequent and comparatively light, and are produced by what are termed "northers" that in the winter months are sometimes felt as far south as Panama, and are also due to the trade winds that at times strike the Isthmus after crossing the warm Caribbean Sea.

On the Caribbean side of the Isthmus the dry season is confined practically to the months of January, February, and March, and the heaviest rains of the year are likely to occur in April. On the watershed of the Canal Zone the first four months of the year are usually dry, the spring maximum occurs in May, and the rainfall of the August *veranillo* is frequently heavy. The August interval of dry weather of the Central American countries as a whole is in fact inconspicuous along the Canal Zone. On the Pacific side of the Isthmus the wet season extends from May to November, inclusive, with periods of maximum rainfall in June and November, and the dry season of December to April, inclusive, is better defined than on the watershed and on the Atlantic side.

The mornings of the wet season are, as a rule, cool and fresh. Preceding and during the afternoon and night rains, however, the atmosphere is sultry and oppressive, and in the low-lying Atlantic end of the Canal Zone the heat is particularly trying. In the dry season of the winter and early spring months temperatures are usually pleasant, except during the prevalence of "northers" when the weather is sometimes disagreeably cool.

At no point in the Canal route does the elevation above sea level exceed 300 feet. The entire strip may, therefore, be placed in the "hot zone", a term that is applied to portions of the Central American coast districts that are less than 300 or 400 feet above the level of the sea. The Atlantic, or Caribbean Sea, side of the Isthmus is, however, lower, hotter, more humid, and more malarial than the Pacific side. At Colon the April rainfall averages about 36.5 inches, which equals the annual rainfall in the Middle Atlantic States of the United States. The November rainfall at Colon is nearly 23 inches, and the so-called August dry interval yields about 15 inches. On the watershed the monthly rainfall amounts to about 13 inches in May, September, October, and November, with a maximum of 14 inches in August. At Panama the maximum, about 12 inches, occurs in November, and 7 to 9 inches falls monthly from May to October, the least amount during this period being about 7 inches, in August. Daily rainfalls of 5 to 7 inches and hourly amounts of 1 to 2 inches are not uncommon in the Canal Zone during the wet season.

In plans for the construction and operation of the Canal the importance of the study of the vicissitudes of Panama rainfall can not be overestimated. The rainfall element does not enter so largely into the problem of a sea-level canal; in a lock canal, however, whose feeders are subject to sudden and violent floods, a due consideration of the variability, intensity, and duration of rainfalls, and of possible periodicities in years of excessive rains, is of the utmost importance. Periodicities in maximum and minimum rainfall periods are most likely to be defined in the equatorial rain belt, for in this region the association with terrestrial and solar causes of meteorological effects is undoubtedly the most apparent, and it is here that variations in primary causes can be the more readily detected by means of observed facts. In an adjustment of available Central American rainfall observations made in 1895, Professor Harrington[1] noted a succession of maxima and minima of annual rainfalls, with intervals of recurring years of unusually heavy rains that ranged from five to eight years, and an average interval between the maxima of six years.

Aside from the value that may be attached by meteorologists to investigations of the periods of excess and deficiency in Panama rainfall, the results of investigations of this kind are calculated to be of practical value to engineers and of interest to the American public. In short, the construction of a lock canal in a part of the equatorial rain belt that is visited by seasonal downpours, which at intervals of several years are likely for periods of days and perhaps months to be abnormally heavy, presents a new and most important problem in canal construction.

OBSERVATION OF CLOUD ALTITUDES AT NIGHTTIME.

In 1872 the Editor had occasion to make a report to the Chief Signal Officer on the importance of observing clouds, their altitudes, motions, and phenomena in greater detail than was common at that time. Among many methods recommended he enumerated the use of small balloons, filled with hydrogen gas, each carrying a long thread, by means of which its initial vertical velocity and its subsequent altitude could be determined at any time, whenever it entered or emerged from a cloud. The necessary balloons and instructions for using this method were furnished for the use of the arctic expedition of the schooner *Florence* in 1877.

Among other methods for permanent use at a fixt station, and as almost the only method appropriate for work at nighttime, he urged that within a few miles of an observer, a searchlight should be stationed, pointing vertically upward, and thus illuminating a circular patch of cloud or haze at the zenith.

The above methods are also described on pages 311 and 323 of the editor's "Meteorological apparatus and methods". He has often urged that this latter method of observation at nighttime is one of great value, likely to give us many new ideas as to the growth and structure of clouds. It is, therefore, with peculiar pleasure that we learn from the Geographical Journal, February, 1907, that Dr. J. Reden, assistant at the astronomical observatory at Vienna, has independently hit upon the same method, making use of the electric reflectors of the Leuchtbrunnen, or luminous fountain, erected at a point on the Ringstrasse, about a mile from the observatory. The observer has merely to measure the apparent angular altitude of the center of the luminous spot in the sky. The tangent of this angle, multiplied by the distance of the vertical beam of light, gives the linear height of the cloud. The first measurements were made June 14–24, 1906, and elevations between 5100 and 33,000 feet were soon measured. When the lower layer of clouds is thin it has become possible to detect three successive layers. The writer adds:

> The new method surpasses in exactitude the most trustworthy of the methods hitherto applied, viz, the photogrammetric, determining as it does the altitude in question with positive accuracy. It is hoped to start a systematic course of such observations in other parts of the earth as well. There is no doubt that not only for science, but also for practical weather forecasts, such observations will prove highly serviceable.

FOG ON THE NEWFOUNDLAND BANKS.[1]

By C. T. BRODRICK. Dated Harvard University, Cambridge, Mass., March 22, 1907.

During the greater part of the year the route for high-powered steamers between Nantucket Lightship and Fastnet or the Scilly Islands crosses the forty-seventh meridian to the south of latitude 43° north, making a considerably greater distance to be traversed by thus avoiding the Grand Banks. This circuitous route is taken because of the fog and the ice found in this district during the spring and summer months. Numerous collisions with other vessels and with icebergs occur every year, and some accidents in the past have been accompanied by large loss of life.

The occurrence of fog about the coasts of Newfoundland and farther north was noted by some of the earliest explorers of the regions—Cook, Ross, Parry, and others.[2] They remarked on its density, that it did not extend to any great height above the water, and that it was most prevalent with southerly winds. Some interesting speculations on the causes of these fogs are set forth at considerable length in Henry Ellis's "Voyage to Hudson's Bay," (1748).[3] His fantastic theories are in strange contrast with our present ideas, even with his own considerable accuracy of observation.

In 1822 Scoresby[4] published some data which he had accumulated during the previous summer. His general conclusions were that fogs are more prevalent during the summer months, that they have an average thickness of from 150 to 250 feet, and that they are accompanied by inversions of temperature.

[1] Phil. Soc. of Wash., Bul., Vol. XIII, pp. 1–30.

[1] This article was prepared as a part of my college work in an advanced course in meteorology and climatology, under Prof. R. DeC. Ward. My original intention was to add some charts embodying the information kindly sent me by Mr. James Page, of the U. S. Weather Bureau, but the present work is principally bibliographic and historical. The article by Mr. Proctor, in the January, 1907, Review, was not available for me until after I had finished this work.

[2] Cf. Bibliography under Muncke.

[3] Cf. Bibliography: Ellis.

[4] Cf. Bibliography: Scoresby.

He thought they were caused by the chilling of warm, damp air thru contact with the ice.

With the exception of a few scattered articles which added nothing new, little was written on these subjects down to 1875.[5] In 1877 an article by Neumann[6] gave an excellent summary of the facts known at that time and the theories as to the causes of the fog. He noted particularly the effect of the proximity of the Gulf Stream and the Labrador current, the vast amount of floating ice, and the prevailing winds, and he also suggested that the temperature of the water should be the best warning to vessels in a fog of the proximity of ice fields or bergs.

During the next ten years considerable interest was taken in the subject and several papers were printed. The work of two men deserves special notice. In a series of articles in the MONTHLY WEATHER REVIEW[7] Prof. E. B. Garriott outlined the conditions governing the prevalence of fog in relation to the passage of cyclones and anticyclones north of latitude 35° north, and suggested the feasibility of predicting fog and issuing forecasts for outgoing steamers.

Two years later, in 1889, J. P. Finley[8] published a "Sailor's Handbook", in which he quoted from Professor Garriott's word, adding a series of charts showing the average and extreme limits of fog areas, based on data accumulated during the previous 32 months.

By far the most complete discussion of the subject is an article by Dr. Gerhard Schott,[9] entitled "Die Nebel der Neufundland Banke". With the addition of an article in the Annalen for 1904 on the relation of fog to wind, it expresses completely the present views, which may be briefly summarized as follows:

These fogs occur roughly over the area inclosed on the maps by the 200-fathom line, forming two centers of maximum frequency, one over the Grand Banks, southeast of Newfoundland, the other east of Massachusetts Bay. Over the greater part of this district, from May to August, more than 60 per cent of the total number of hours of observation are foggy. The minimum occurs in February. Southerly to westerly winds of a force 3 or 4 on the Beaufort scale are the most favorable to fog formation. Warm air from over the ocean, heavily charged with moisture, is thus brought in contact, within a distance of less than 300 miles, with colder water at a temperature of 30° F., and the formation of fog results. These conditions occur in the southeastern quadrant of a cyclone which leaves the States north of latitude 40° north. After the passage of the low area northwest winds follow, and these are accompanied by clearing weather. During the winter the close succession of cyclonic and anticyclonic areas prevents the long-continued fogs characteristic of the stagnant atmospheric conditions of the summer. Moreover, the prevailing winds during the summer are from a southerly quadrant, while those of the winter are from the northwest.

The importance of collecting data on these fogs and charting them, has been recognized by most of the nations whose shipping is affected. Pilot charts on which the occurrence of fog is shown are published monthly by Germany, Great Britain, and the United States.

In 1880 the Deutsche Seewarte[10] published the first of its "Resultate Meteorologischer Beobachtungen", more often called the "Quadrat Arbeit", which contain the results for 1-degree squares of all meteorological observations reported by German and Dutch ships in the North Atlantic. One column is devoted to the duration of fogs in hours, another to the number of "observation watches". As these watches are of the customary 4-hour interval, it is necessary to multiply their number by four to get the total number of hours of observation for use as a basis of computation. The publication of these Quadrat-Arbeiten has been continued to cover the entire North Atlantic in the region of the transatlantic steamship routes. It is these data which Doctor Schott used in preparing his monthly charts referred to above. The original source of the data is in all cases the meteorological logs furnished the captains of all German ships. The logs are of two kinds, a large one, the "Meteorologisches Tagebuch", and a smaller one, the "Kleines Wetterbuch". In both the occurrence of fog is noted under the head of "Wetter" and its duration and density under "Besondere Bemerkungen". The Deutsche Seewarte also publishes charts in the "Segelhandbuch"[11] and "Dampferhandbuch"[12] for the North Atlantic Ocean in which these data are grouped in 5-degree squares. On the German pilot charts fog is shown by different shadings covering areas of 10 to 25 per cent, 25 to 50 per cent, and more than 50 per cent, respectively.

A set of charts published by the Netherlands,[13] on which fog is also shown in this way, were compiled from the German data, except in low latitudes where the Dutch data were used.

On the British pilot charts of the North Atlantic and Mediterranean the areas of maximum fog frequency are shown similarly by shading areas of 10, 25, and 50 per cent. In reply to questions regarding the source of the data the following statement was received from the British Meteorological Office:

> The German data given in 1-degree squares were grouped by us in 5-degree squares, and our own data were taken out for areas of 5° longitude to 1° latitude. For latitudes north of 50° north the data were extracted from meteorological logs contributed by captains of the merchant marine to this office.

In these logs fog is recorded under the head of "Weather" and "Remarks", as in the German logs.

The first pilot charts issued by the United States Navy in 1884 contained no graphical indications of fog, tho the occurrence of fog during the previous month was noted in the margin. In August, 1887, the belts where fog had occurred were indicated by one grade of shading. In 1891 areas of "probable frequent fog" were also shaded. In July, 1895, a series of inset charts were published on the back of the pilot chart for that month, showing the fog reported during 1894. The track of each ship, with the date of entering and leaving fog and its character, was noted. In 1899 the area of fog was shown by different shading for each 10 per cent variation. In 1902 the first of the present form of inset charts was published. These show for 1-degree squares the percentage of fog as reported since 1894. Mr. James Page, formerly editor of these pilot charts, but now chief of the Division of Ocean Meteorology, U. S. Weather Bureau, in writing of the manner in which the figures were obtained, says:

> The reports from which this information is derived give the date and position of entrance into the fog, and the date and position of emergence from it. The fog is plotted as present upon the given date within the 1-degree square which the vessel traverses during the interval. Having obtained for the given month and for the given square the total number of days on which fog was reported, the number is divided by 30 or 31, as the case may be, to obtain the percentage. The figures on the chart are the average of several years thus treated.
>
> This method assumed that fog was present only on dates when it was actually reported, and that it was not present on the remaining dates. The exprest percentages are thus always less than the truth, especially for those squares within which observations are infrequent. In the immediate vicinity of the transatlantic routes the figures are probably of fair accuracy. In regions which are rarely visited by reporting vessels, such as that immediately to the east of Newfoundland, they have no value whatever.

[5] The occurrence of fog on the coast from New Jersey to Maine was frequently forecast in the early weather probabilities.—EDITOR.
[6] Cf. Bibliography: Neumann.
[7] Cf. Bibliography: Garriott.
[8] Cf. Bibliography: Finley.
[9] Cf. Bibliography: Deutsche Seewarte (Annalen).
[10] Cf. Bibliography: Deutsche Seewarte.
[11] Cf. Bibliography: Deutsche Seewarte.
[12] Cf. Bibliography: Deutsche Seewarte.
[13] Cf. Bibliography: Utrecht.

The "reports" which Mr. Page refers to are special blanks on the back of the meteorological logs furnished for use of navigators by the Weather Bureau, on which the civil date, the ship's time, latitude, longitude, the temperature of the air and water, and the character of the fog are entered. Fog is also noted in these logs under the head of "Weather experienced".

After a careful review of the existing charts of fog distribution over the North Atlantic, it seems to the writer that the German method of obtaining the percentages of fog with reference to the total number of hours of observation is on the whole preferable, altho neither method is perfectly accurate and satisfactory.

BIBLIOGRAPHY.

Deutsche Seewarte zu Hamburg.

Annalen der Hydrographie und Maritimen Meteorologie 1897, 390 ff. 1904, 107 ff.

Atlas für den Atlantischen Ozean 1902. Plate 32 and text.

Aus dem Archiv der Deutschen Seewarte No. 1 B VII, III 1875–1878, 72–78.

Dampferhandbuch für den Atlantischen Ozean 1905, 32. Figur 14–15.

Quadrat-Arbeit. Cf. Resultate.

Resultate Meteorologischer Beobachtungen von Deutschen und Hollandischen Schiffen für Eingradfelder des Nordatlantischen Ozeans. Hamburg 1880.

Segelhandbuch für den Atlantischen Ozean 1899, 120–121 (Cf. Plate 32 of Atlas).

Ellis, Henry.

Voyage to Hudson's Bay by Dobb's Galley and California, 1746–1747. London 1748, 283 ff.

Finley, John Park.

Sailor's Handbook of Storm, Track, Fog and Ice Charts, 1889.

Garriott, E. B.

On the prevalence of rain, thunder, lightning, and fog, in the South Atlantic, North Atlantic, and North Pacific oceans. Pr. Brit. Met. Soc. London IV, 1869, 101–112.

Harvey, George.

On the fogs of the Polar seas. Quart. Jour. Sci. London XX, 1826, 11–13.

Kiddle, W. W.

Fogs, field ice, and icebergs in the Atlantic. Nature, London X, 1874, 285.

Marcet, Wm.

Quart. Jour. Roy. Met. Soc., Vol. XV. 1889, April.

Muncke, G. W.

Nebel. Gehler's Phys. Woerterb. Leipzig VII, part 1, 12–34.

Nautical Magazine.

London XXV, 1866, 505–511.

Neumann, E.

Bemerkung.... über die Neufundland bank Nebel. Ann. Hydr. Berlin V. 1877, 533.

Schott, Gerhard.

Die Nebel der Neufundland Banke. Annalen der Hydrographie, 1897.

Scoresby, Wm.

Edinb. Phil. Jour. VI, 1822, 118.

U. S. Monthly Weather Review.

Limit of fog areas in the North Atlantic. Oct., 1886, Dec., 1887. Cf. E. B. Garriott.

Utrecht K. Nederl. Met. Inst.

Verzameling van kaarten.... mist. etc., uitgegeven.... Utrecht in 1862.

Also the standard text-books by Allingham, Davis, Findlay, Hann, Kaemtz, Loomis, Russell, Scott, etc.

WEATHER BUREAU MEN AS EDUCATORS.

The following lectures and addresses by Weather Bureau men have been reported:

Mr. Al. Brand, February 12, 1907, before certain residents of Evansville, Ind., on "Instruments used and work done by the U. S. Weather Bureau".

Mr. G. R. Oberholzer, February 21, 1907, before the Chamber of Commerce, Erie, Pa., on "The service of the Weather Bureau".

Mr. M. V. Robins, January 14, 1907, before the Men's Club of Plymouth Congregational Church, Omaha, Nebr., on "The Weather Bureau and its work".

Mr. M. R. Sanford, February 19, 1907, before the Current Events Club, Syracuse, N. Y., on "Current events in the atmosphere".

Mr. J. Warren Smith, of the Columbus, Ohio, office, February 6, 1907, before a farmers' institute at Jeffersonville, Ohio, on "The work of the Weather Bureau".

Mr. J. F. Voorhees, February 21, 1907, before the students of horticulture, at the University of Tennessee, Knoxville, on "Frost protection"; also February 22, 1907, before the students of the North Knoxville High School on "Weather forecasting".

Classes from universities, academies, and schools have visited Weather Bureau offices to study the instruments and equipment and receive informal instruction, as reported from the following offices:

Buffalo, N. Y., February 15 and 18, 1907, pupils from Public Schools Nos. 6 and 54.

Columbus, Ohio, February 8, 1907, a class in physical geography from the Central High School; February 9, 1907, the class in agriculture (short course), from Ohio State University; February 15 and 20, 1907, sections of the physical geography class from the South High School.

Fort Worth, Tex., February 13, 1907, the graduating class of Saint Ignatius Academy.

Los Angeles, Cal., February 15, 1907, the physical geography class of the Gardena High School.

Mobile, Ala., February 7, 1907, the graduating class of Barton Academy.

Oklahoma, Okla., February 8, 1907, the physical geography class of the Epworth University Academy.

Raleigh, N. C., February 6, 1907, the physical geography class of Peace Institute.

Springfield, Mo., February 2, 1907, the physical geography class of Drury College; February 20, 1907, the physical geography class of Springfield High School.

Syracuse, N. Y., February 12, 1907, the physical geography class of Jordan High School.

RECENT PAPERS BEARING ON METEOROLOGY.

H. H. KIMBALL, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American journal of science. New Haven. Vol. 23. Mch., 1907.

Barus, Carl. Changes of the colloidal nucleation of dust-free wet air in the lapse of time. p. 202–210.

Bulletin of the American geographical society. New York. Vol. 39. Feb., 1907.

Surface, G. T. Climate and boundaries of Virginia. p. 92–102.

Geographical journal. London. Vol. 29. Mch., 1907.
O., R. D. The Kingston (Jamaica) earthquake. p. 332–334.
—— The desiccation of Eurasia. [Note on article by L. Berg.] p. 350–351.
Journal of geography. New York. Vol. 5. Dec., 1906.
Ward, Robert DeC. The characteristics of the zones: III. The polar zones. p. 433–450.
Nature. London. Vol. 75.
—— Inversion temperatures for air and nitrogen. [Abstract.] (Feb. 14, 1907.) p. 379–380.
—— Prof. J. F. W. von Bezold. (Feb. 21, 1907.) p. 397.
P., W. E. H. C Russell. (Mch. 7, 1907.) p. 442–443.
Proceedings of the Royal society. London. Series B. Vol. 79.
Hill, Leonard, and Greenwood, M. The influence of increased barometric pressure on man: II. p. 21–27.
Proceedings of the Tokyo mathematico-physical society. Tokyo. Vol. 3.
Terada, T. Notes on seiches. p 174–181.
Honda, K. On the seiches in Lake Chiuzenji. p 220–223.
Proceedings of the Washington academy of sciences. Washington. Vol. 8.
Bell, Alexander Graham. Aerial locomotion. p. 407–448.
Quarterly journal of the Royal meteorological society. London. Vol. 33. Jan., 1907.
Mill, Hugh Robert. The international congress on polar exploration at Brussels, September, 1906. p. 1–4.
—— Climate of the wheat area of central Canada. [Note.] p. 55.
—— Blue Hill meteorological observatory, Mass., U. S. A. [Abstract.] p. 66–67.
—— Errors of absorption hygrometers. [Abstract.] p. 67–68.
—— The insolation of Switzerland. [Abstract.] p. 68–69.
—— Climate of the Niger basin. [Abstract. p. 69–70.
—— Climate of Hebron. [Abstract.] p. 71–73.
Review of reviews. New York. Vol. 35. Mch., 1907.
—— Influence of the ocean on climate. [Review.] p. 376–377.
—— The effect of climate on character. [Review.] p. 377–378.
Science. New York. New Series. Vol. 25. Mch. 15, 1907.
—— The seismological society of America. p. 437.
Scottish geographical magazine. Edinburgh. Vol. 23. Mch., 1907.
[Albert] Prince of Monaco. Meteorological researches in the high atmosphere. p. 113–122.
Symons's meteorological magazine. London. Vol. 42. Feb., 1907.
Lempfert, R. G. K. The high barometer of January, 1907. p. 1–3.
Inwards, Richard. Weather whims: I. The butterfly hygroscope. p. 3–5.
—— The Lander recording gage. p. 4–5.
—— A readership in dynamical meteorology. [Announces the endowment of a readership under direction of the Meteorological office.] p. 6–7.
—— Adam F. W. Paulsen. p. 7.
Aérophile. Paris. 15 année. Fév., 1907.
Seux, Edmond. Dévelopment du réseau des stations d'ascensions internationales. p. 49–50.
Archives des sciences physiques et naturelles. Genève. 4 période. Tome 13. 15 jan., 1907.
Forel, F. A. Les variations périodiques des glaciers; XI rapport, 1905, de la commission internationale des glaciers. p. 36–44.
Bulletin de la Société belge d'astronomie. Bruxelles. 12 année. Fév., 1907.
Flamache, Léon. Les formes cristallines de l'eau. p. 33–40.
Arctowski, Henryk. Variations de la vitesse du vent dues aux marées atmosphériques. p. 40–54.
—— L'inefficacité du tir contre la grêle. p. 73–74.
Gheury, E. S. Observations sur la nature et l'intensité de l'éclat du ciel. [Note on article by H. F. Newall.] p. 74–76.
Comptes rendus de l'Académie des sciences. Paris. Tome 144. 4 fév., 1907.
Bigourdan, G. Sur la relation entre les chutes de la pression barométrique et les dégagements de grisou dans les mines. p. 247–249.
Revue néphologique. Mons. Fév., 1907.
Alippi, Tito. Nuages irisés. p. 105–106.
Bracke, A. La fréquence des cirrus et la pression au Caire. p. 109–110.
Annalen der Hydrographie und maritimen Meteorologie. Berlin. 35 Jahrgang. 1907.
—— Windgeschwindigkeitsmesser von Rotch. p. 52–53.
Knipping, E. Die Dampferwege zwischen Yokohama und Portland, Oreg. p. 53–64.
Arendt, Th. Uber die Gewitterverhältnisse an der deutschen Nordsee-und Ostseeküste. p. 69–83.
Soley, John C. Der Golfstrom von Mexiko. p. 84–87.
Gaea. Leipzig. 43 Jahrgang. März, 1907.
—— Das Ende des Hagelschiessens. p. 186.
Klein, —. Die Wahrheit über den Stand des Wetterprognosenwesens. p. 157–167.
Omori, F. Die Beobachtung entfernter Erdbeben. p. 193–201.
Schütt, R. Die Hauptstation für Erdbebenforschung am Physikalischen Staatslaboratorium zu Hamburg. p. 201–206.
Meyer, G. Studien über Mondwirkungen auf die Bahnrichtung der barometrischen Minima. p. 217–220.
Illustrierte aëronautische Mitteilungen. Strassburg. 11 Jahrgang. März, 1907.
Linke, F. Meteorologische Drachenaufstiege in Samoa. p. 74–78.
Nimführ, R. Ueber eine neue automatische Abstellvorrichtung der Schreibfedern von Registrierapparaten für unbemannte Diagramme. p. 78–81.
Meteorologische Zeitschrift. Braunschweig. Band 24. Jan., 1907.
Ekholm, Nils. Ueber die unperiodischen Luftdruckschwankungen und einige damit zusammenhängende Erscheinungen. p. 1–11.
Dorscheid, Otto. Die mittlere Dauer des Frostes auf der Erde. p. 11–24.
Gorodensky, M. Ueber den Guldberg-Mohnschen Ablenkungswinkel. p. 25–30.
Ficker, H. v. Föhn in den Ostalpen am 7. und 8. November 1906. p. 30–31
Johansson, Oscar, V. Einige Bemerkungen zu der Abhandlung von Prof. G. Hellmann: "Ueber die Eintrittszeiten der täglichen Temperaturextreme", im Hann-Band dieser Zeitschrift. p. 31–34.
Hellmann, G. Wage-Ombrograph Rohrdanz. p. 39–40.
—— Resultate der meteorologischen Beobachtungen auf der "Robinsoninsel" Juan Fernandez. p. 40–41.
Osthoff, H. Strenger Winter 1905–06 in Mesopotamien. p. 41.
Siegel, Franz. Regenfall in Rio de Janeiro und dessen Schwankungen. p 42–44.
Weber, L. Zur Orthographie des Wortes Halo. p. 44–45.
Meteorologische Zeitschrift. Braunschweig. Bd. 24. Feb., 1907.
Dorscheid, Otto. Die mittlere Dauer des Frostes auf der Erde. p. 49–63.
Burchard, Oscar. Ein Beitrag zur Klimatologie der Kanarischen Inseln. p. 64–74.
Hann, Julius. Gilbert T. Walker: Ueber die Beziehungen des SW-Monsun-Regenfalles in Indien zu den Witterungszuständen entfernter Gegenden. p. 74–79.
König, Willi. Resultate der meteorologischen Beobachtungen von Islote de los Evanjelistas, 1899 bis 1904. p. 81–84.
Maurer, Jul. Meteorologische Beobachtungen auf dem Tödigipfel. p. 84–86.
Wetter (Das). Berlin. 24. Jahrgang. Feb., 1907.
Kaiser, Max. Historische Entwickelung unserer Kenntnis der Land- und Seewinde auf der Erde und Darstellung der gegenwärtigen Theorien. p. 25–33.
Lindemann, —. Vierzigjährige Temperaturmittel (1866–1905). [Normals for 10 stations in Saxony.] p. 33–37.
Meissner, Otto. Die Bedeutung von Morgen- und Abendröte für die Lokalprognose von Niederschlägen. p. 41–42.
Società meteorologica Italiana. Bollettino bimensuale. Torino. Serie III. Vol. 25. Ott.-Nov., 1906.
Vigodarzere, Antonio Cittadella. Quinta conferenza internazionale di aeronautica scientifica tenutasi a Milano nell'Ottobre 1906. p. 88–90.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

H. H. KIMBALL, Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them.

Abbot, Henry L.
Hydrology of the Chagres river. (George Washington university bulletin, v. 5, 1906, No. 4.) Washington. 1906. p. [48]–54. 8°.
Austria. K. k. Zentralanstalt für Meteorologie und Geodynamik.
Bericht über die internationale meteorologische Direktoren-Konferenz in Innsbruck September 1905. Wien. 1906. iv, 154 p. 4°.
Battandier, J. A. and Trabut, L.
L'Algérie, le sol et les habitants . . . Paris. 1898. viii, 360 p. 8°.
Carnegie institution of Washington.
Year book. No. 5. 1906. Washington. 1907. viii, 266 p. 8°.
Condra, George Evert.
Geography of Nebraska. Lincoln, 1906. vii, 192 p. 12°.
Congrès international pour l'étude des régions polaires, Bruxelles, 1906.
Rapport d'ensemble. Bruxelles. 1906. v. p. 8°.
Ellinger, H. O. G.
Forelaesninger over meteorologi ved den Kongelige veterinearog landbohojskole. New ed. Kjobenhavn. 1906. 123 p. 8°.
Esmarch, E[rwin] von.
Zwei Registrierinstrumente für Sonnenschein und Windrichtung. (S.-A. Hygenischen Rundschau 1906 No. 6.) n. p. n. d. 5 p. 8°.
Finska vetenskaps-societeten.
Acta societatis scientarum Fennicae. Tomus 32. Helsingforsiae. 1906. v. p. 4°.

Freybe, Otto.
Praktische Wetterkunde ... Berlin. 1906. vi, 173 p. 8°.

Grünert, Artur.
Die Temperaturverhältnisse der Grossherzogtümer Mecklenburg auf Grund 50 jähriger Beobachtungen. Inaug.-Diss ... Rostock. Schwerin. 1905. 38 p. f°.

Hartl, Hans.
Einführung in die Wetterkunde. Reichenberg. 1900. 25 p. 4°.

Hoffmann, Eugène.
Traité populaire sur l'air atmosphérique. Paris. 1898. 144 p. 16°.

Jackson, A. V. Williams.
Persia past and present. A book of travel and research. New York. 1906. xxxi, 471 p. 8°.

Japan. Central meteorological observatory.
Annual report. 1903. Part 1. Tokio. 1906. 345 p. 4°.

Jefferson, Mark S. W.
Material for geography of Michigan. Ypsilanti. 1906. 90 p. 4°. [Contains a chapter on the climate.]

Krebs, Wilhelm.
Taifungefahr in der deutschen Südsee. (S.-A. Globus, Braunschweig, Bd. 90, 1906, p. [80]-82.)

Lockyer, William J. S.
Some world's weather problems. (Repr. Science progress, Oct., 1906.) 16 p. 8°.

Loisel, Julien.
Le baromètre anéroïde. Paris. n. d. 24 p. 12°.

Meissner, Otto.
... Die meteorologischen Elemente und ihre Beobachtung mit Ausblicken auf Witterungskunde und Klimalehre ... Leipzig. 1906. vi, 94 p. 4°.

Naselli, D.
Meteorologia nautica. Torino. 1901. 246, [2] p. 8°.

Netherlands. Koninklijk Nederlandsch meteorologisch Instituut.
Onweders, optische verschijnselen, enz., in Nederland. 1904. Amsterdam. 1906. 97 p. 8°.

Oña. Colegio Maximo de la Compania de Jesus.
Observaciones meteorologicas. [1906] Oña. 1907. 32 p. 8°.

Palazzo, [Luigi].
Carta magnetica delle isodinamiche d'Italia. Napoli. 1905. 24 p. 4°.
Magnetic elements determined at Tripoli, Barbary. (Fr. Ter. mag., June, 1906.) p. [93]-96. 4°.
Pietro Tacchini, cenni necrologici. Modena. 1905. 14 p. 8°.
Su di un nuovo modello di pluviometro registratore. Roma. 1906. 8 p. 4°.

Passerini, N.
Meteorologia e climatologia applicate all'agricoltura e all'igiene. Milano. 190? 246 p. 12°.

Prussia. Königliches preussisches meteorologisches Institut.
Ergebnisse der Niederschlags-Beobachtungen. 1903. Berlin. 1906. lxxvi, 160 p. f°.

Royal meteorological society.
Royal meteorological society. [Brief history and description] [Westminster, 1907] 7 p. 8°.

Sanborn, Frank B.
Mechanics; problems for engineering students. New York. 1906. viii, 194. 8°.

Saxony. Königliches sächsisches meteorologisches Institut.
Dekaden-Monatsberichte (Vorläufige Mitteilung). Jahrgang 8, 1905. Dresden. 1906. 118 p. f°.

Scottish meteorological society.
Journal. Third series, No. 23. With tables for the year 1905. Edinburgh. 1906. 97 p. 4°.

Smithsonian institution.
Annual report of the Board of regents. 1905. Washington. 1906. liv, 576 p. 8°.

Société astronomique et météorologique de Port-au-Prince.
Bulletin annuel. 1906. Port-au-Prince. 1907. 39 p. 4°.

Steffens, Otto
Die Blitzgefahr in Deutschland von 1854 bis 1901, ein Beitrag zur Gewitterkunde. Inaug.-Diss ... Berlin. [Berlin. 1904] 33 p. 8°.

Walter, Alois.
Theorie der atmosphärischen Strahlenbrechung. Leipzig. 1898. 74 p. 8°.

Year-book of the scientific and learned societies of Great Britain and Ireland.
23d annual issue. London. 1906. vi, 330 p. 8°.

THE WEATHER OF THE MONTH.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure for February, 1907, over the United States and Canada is graphically shown on Chart VI, and the average values and departures from the normal are shown for each station in Tables I and V.

February, 1907, was ushered in with pressure distribution similar to that which had prevailed during most of the preceding month—high atmospheric pressure over the Canadian Northwest Provinces, and comparatively low pressure over the central Rocky Mountain and Plateau districts, and extending eastward toward the Great Lakes.

The area of high pressure moved rapidly southeastward into the upper Missouri and Mississippi valleys during the first few days of the month, increasing markedly in intensity, and during its passage eastward brought the severest cold of the winter to all districts along the northern border from the Rocky Mountains to New England.

The passing eastward of the above-mentioned high area marked the breaking up of the pressure distribution that prevailed so persistently during January over the Canadian Northwest Provinces and the upper Missouri Valley. Low pressure areas moved into those regions from the north Pacific coast, and high pressure developed over the central Pacific, Plateau, and Rocky Mountain districts, and, extending eastward toward the Mississippi Valley, gave moderate weather conditions over nearly all districts, except New England, from the 6th to the 25th.

From the 25th to the end of the month, a strong area of high pressure, that probably developed far to the north of the field of observation, moved southeastward over Manitoba and surrounding districts, and the month closed with severe weather prevailing in nearly all northern districts from Montana to New England.

The average pressure was highest over the northern Rocky Mountain, Plateau, and upper Missouri districts, and lowest over the Canadian Maritime Provinces. Pressure was above the normal for the month in all districts of the United States and Canada, except portions of New Brunswick and Nova Scotia, where a slight deficiency prevailed. Average pressure .10 inch or more above the normal prevailed in the upper Missouri Valley and north of the Great Lakes toward Hudson Bay.

Under the influence of high pressure north of the St. Lawrence Valley, cold northerly winds were discharged over New England and the lower Lake regions, while along the northern border from the Lakes to the Pacific, with high pressure to the south, warm southerly winds were frequent.

TEMPERATURE.

Unusually warm weather prevailed during most of the month over the entire portion of the United States, from the Mississippi Valley westward to the Pacific, and northward over the Canadian Northwest Provinces. From Nebraska west to the Pacific and south to the Mexican boundary the month was nearly continuously warmer than the average, and no serious cold wave was experienced in that region during the entire month. Over portions of Colorado, Utah, Nevada, and surrounding States the mean temperature exceeded the average by more than 10° daily, and at numerous points was the highest February mean observed in the history of the respective stations.

Over New England, the Middle Atlantic States, and the eastern part of the lower Lake region the cold weather inaugurated during the latter part of January continued, with slight interruptions, during the whole of February, and the month, especially over New England, was one of the coldest in the meteorological history of that section.

During the eastward progress of the high-pressure area over the Northern States, from the 1st to the 5th of the month, severe cold was experienced in the districts from the Dakotas to the Great Lakes, with minimum temperatures 50° or more below zero in parts of northern Minnesota and Wisconsin, and

freezing weather as far south as central Texas. A southern extension of the above-mentioned high area brought a moderate cold wave over the east Gulf and Atlantic coast States from the 7th to the 9th, with temperatures near the freezing point in northern Florida, and of zero or lower in the Appalachian Mountain districts from Virginia northward.

Over southwestern Arizona and the greater part of the lower elevations of California the temperature did not go below the freezing point and killing frosts were reported from but few places.

Temperatures of 30° or more below zero were recorded in northern Maine, central and northern Wisconsin, Minnesota, the Dakotas, and in Montana east of the main range of the Rocky Mountains.

Altho warm weather was the rule in all western districts the maximum temperatures were not unusually high, and readings above 80° were confined to central and southern Texas, southwestern Arizona, southern California, and the Florida Peninsula.

PRECIPITATION.

The month as a whole was one of very light precipitation. Small districts in southwestern Alabama and eastern Mississippi, central North Carolina, the middle Missouri Valley, the central Rocky Mountain and Plateau districts, and near the coasts of northern California and southern Oregon received amounts slightly in excess of the average; elsewhere the monthly precipitation was uniformly less than the average.

From the lower Lakes southwestward over the Ohio and middle Mississippi valleys into northeastern Texas the monthly amounts were largely deficient, and in the central parts of Ohio, Indiana, and Illinois it was the driest February on record.

Over the South Atlantic States and the Florida Peninsula precipitation was again deficient, especially over Florida, where the dry period inaugurated in the autumn of 1906 continued during the entire month. The total deficiency in that State from September, 1906, to February, 1907, inclusive, amounts to more than 10 inches for the entire State.

Along the eastern slopes of the Rocky Mountains and over the Great Plains the precipitation was uniformly light. In the western parts of Kansas, Oklahoma, and Texas, and the eastern parts of New Mexico and Colorado the month was practically without precipitation.

SNOWFALL.

The snowfall was generally light in all districts, except in New England, the Middle Atlantic States, and lower Lake region, where amounts equal to or in excess of the average were generally reported. There was also a slight excess on the western slopes of the mountains in Montana, and on the eastern slopes of the Cascades in Oregon, but elsewhere in the mountain districts of the west the snowfall was largely deficient.

At the end of the month considerable snow remained on the ground from Pennsylvania northeastward over New England. In the northern sections of New York and Maine the accumulated snow had attained a depth of from 2 to more than 4 feet.

From the Lake region westward to Montana the ground was generally covered, altho the warm weather during the middle of the month caused much of the snow to disappear in the southern parts of the district, and materially reduced the depth in the northern sections, and in places cleared the ranges of snow for the first time during the winter.

Over the western mountain districts much snow disappeared from the lower levels, but the unfrozen ground generally absorbed the runoff, while at the higher elevations the warm weather solidified the snow without materially lessening the water contents, thereby tending to insure both a plentiful and long-continued supply of water in the streams.

HUMIDITY AND CLOUDINESS.

Cloudiness and humidity were both slightly deficient in nearly all eastern districts, while from the Mississippi Valley westward these elements were generally in excess of the normal.

The fair and warm weather during the period from the 5th to the 25th over the districts from the Appalachian Mountains westward afforded more than the usual opportunities for the successful prosecution of outdoor occupations.

Average temperatures and departures from the normal.

Districts	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	12	18.8	— 7.0	— 8.2	— 4.1
Middle Atlantic	16	28.6	— 6.2	— 2.8	— 1.4
South Atlantic	10	46.1	— 2.8	+ 4.2	+ 2.1
Florida Peninsula*	8	61.8	— 0.5	+ 4.9	+ 2.4
East Gulf	11	52.0	+ 0.4	+ 9.9	+ 5.0
West Gulf	10	53.8	+ 2.8	+13.2	+ 6.6
Ohio Valley and Tennessee	13	34.3	— 3.2	+ 4.2	+ 2.1
Lower Lake	10	21.2	— 5.3	— 3.7	— 1.8
Upper Lake	12	18.0	— 1.4	— 1.4	— 0.7
North Dakota*	9	12.0	+ 4.9	— 6.5	— 3.2
Upper Mississippi Valley	15	26.3	+ 1.5	+ 3.9	+ 2.0
Missouri Valley	12	28.1	+ 3.6	+ 4.1	+ 2.0
Northern Slope	9	27.5	+ 6.4	+ 0.5	+ 0.2
Middle Slope	6	38.3	+ 5.9	+10.1	+ 5.0
Southern Slope*	7	47.0	+ 6.5	+14.6	+ 7.3
Southern Plateau*	12	48.8	+ 7.0	+ 9.8	+ 4.9
Middle Plateau*	10	39.9	+11.2	+13.6	+ 6.8
Northern Plateau*	12	35.4	+ 5.8	+ 1.1	+ 0.6
North Pacific	7	43.6	+ 3.1	— 1.0	— 0.5
Middle Pacific	8	53.6	+ 4.4	+ 3.1	+ 1.6
South Pacific	4	58.4	+ 5.0	+ 4.4	+ 2.2

* Regular Weather Bureau and selected cooperative stations.

In Canada.—Director R. F. Stupart says:

West of Lake Superior the mean temperature of the month was above the average, while east of it the mean was below the average. The largest positive departures, amounting to 7°, occurred in Saskatchewan, and the largest negative departures, also about 7°, occurred in western Quebec and southern New Brunswick. In the Western Provinces the extremes of temperature were pronounced, five days of extreme cold being followed by a fortnight of unseasonably mild weather which was in turn followed by moderately cold weather. From Ontario eastward the temperature was almost continuously below average.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	12	2.19	65	—1.2	—2.1
Middle Atlantic	16	2.26	67	—1.1	—2.5
South Atlantic	10	2.54	68	—1.2	—4.6
Florida Peninsula*	8	0.95	30	—2.2	—4.7
East Gulf	11	4.86	102	+0.1	—2.5
West Gulf	10	1.90	58	—1.4	—2.6
Ohio Valley and Tennessee	13	1.87	44	—2.4	—0.5
Lower Lake	10	0.77	29	—1.9	—0.4
Upper Lake	12	0.63	33	—1.3	—0.8
North Dakota*	9	0.29	49	—0.3	+0.4
Upper Mississippi Valley	15	0.77	41	—1.1	+0.6
Missouri Valley	12	0.98	83	—0.2	+1.0
Northern Slope	9	0.50	83	—0.1	+0.1
Middle Slope	6	0.53	73	—0.2	+0.1
Southern Slope*	7	0.31	34	—0.6	—0.2
Southern Plateau*	12	0.68	63	—0.4	+0.6
Middle Plateau*	10	1.20	100	0.0	+0.3
Northern Plateau*	12	2.01	125	+0.4	+0.5
North Pacific	7	5.06	89	—0.6	—2.4
Middle Pacific	8	4.29	102	+0.1	+0.9
South Pacific	4	1.42	54	—1.2	+1.6

* Regular Weather Bureau and selected cooperative stations.

In Canada.—Director Stupart says:

In British Columbia the precipitation was above average in most localities, and was chiefly in the form of rain, which at the lower levels soon cleared away the snow which lay on the ground early in the month. In the Western Provinces there was no rain and the snowfall was quite light. In Ontario there were many light snowfalls, and in the southwestern part of the province a few showers, while in Quebec there were many snowfalls, some of which were heavy. In the Maritime Provinces

the total precipitation was very generally in excess of the average, with some rain; but it was for the most part snow, which in a few instances was heavy.

At the close of the month southwestern Alberta and the lower levels of southern British Columbia were bare of snow, while all other districts were covered.

In Quebec and New Brunswick the depth was considerable, ranging from 30 to 60 inches, but in Ontario and the Western Provinces a covering of less than 24 inches in northern districts lessened to a depth of a few inches in the more southern portions.

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Block Island, R. I.	3	52	w.	Mount Weather, Va.	3	50	nw.
Do	5	64	ne.	Do	10	52	nw.
Do	11	58	nw.	Do	11	52	nw.
Do	12	50	nw.	Do	14	68	nw.
Do	21	50	nw.	Do	15	56	nw.
Do	23	54	nw.	Nantucket, Mass.	5	70	ne.
Buffalo, N. Y	2	72	sw.	North Head, Wash.	4	52	s.
Do	3	63	w.	Do	5	59	s.
Do	10	66	sw.	Do	7	55	se.
Do	14	53	sw.	Do	23	62	se.
Burlington, Vt.	3	54	w.	Do	24	65	se.
Do	13	54	se.	Do	25	57	s.
Do	14	53	se.	Oswego, N. Y	2	52	w.
Canton, N. Y.	2	69	sw.	Point Reyes Light, Cal	25	56	nw.
Do	3	72	sw.	Do	26	52	nw.
Cheyenne, Wyo.	1	50	w.	Pueblo, Colo	1	50	w.
Chicago, Ill.	2	50	nw.	Sault Ste. Marie, Mich	24	50	nw.
Cleveland, Ohio	2	52	w.	Seattle, Wash.	5	53	s.
Do	10	60	w.	Sioux City, Iowa.	1	52	nw.
Duluth, Minn.	13	54	nw.	Syracuse, N. Y.	3	50	sw.
Do	14	50	nw.	Do	24	50	s.
Eastport, Me.	5	50	ne.	Tatoosh Island, Wash.	3	60	e.
Do	17	50	ne.	Do	4	52	e.
Do	18	50	ne.	Do	5	61	sw.
Grand Haven, Mich.	10	50	w.	Do	7	63	s.
Mount Tamalpais, Cal.	2	52	w.	Toledo, Ohio	2	50	w.
Do	24	55	w.				

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.2	— 0.3	Missouri Valley	5.2	— 0.2
Middle Atlantic	5.0	— 0.6	Northern Slope	5.3	+ 0.1
South Atlantic	5.2	— 0.1	Middle Slope	4.3	— 0.1
Florida Peninsula	3.2	— 1.3	Southern Slope	3.5	— 1.1
East Gulf	5.0	— 0.7	Southern Plateau	3.3	+ 0.3
West Gulf	4.8	— 1.0	Middle Plateau	4.9	+ 0.6
Ohio Valley and Tennessee	6.2	0.0	Northern Plateau	6.7	+ 0.5
Lower Lake	6.4	— 0.4	North Pacific	7.1	+ 0.1
Upper Lake	6.0	— 0.3	Middle Pacific	7.3	+ 2.5
North Dakota	4.4	— 0.4	South Pacific	5.2	+ 1.1
Upper Mississippi Valley	5.4	+ 0.1			

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	72	— 3	Missouri Valley	75	0
Middle Atlantic	72	— 2	Northern Slope	74	+ 3
South Atlantic	77	+ 1	Middle Slope	62	— 5
Florida Peninsula	78	— 2	Southern Slope	56	— 8
East Gulf	73	— 3	Southern Plateau	54	+10
West Gulf	70	— 4	Middle Plateau	65	+ 2
Ohio Valley and Tennessee	72	— 2	Northern Plateau	77	+ 3
Lower Lake	79	— 1	North Pacific	85	+ 2
Upper Lake	79	— 3	Middle Pacific	83	+ 8
North Dakota	80	+ 1	South Pacific	74	+ 5
Upper Mississippi Valley	78	+ 1			

CLIMATOLOGICAL SUMMARY.

By Mr. JAMES BERRY, Chief of the Climatological Division.

TEMPERATURE AND PRECIPITATION BY SECTIONS, FEBRUARY, 1907.

In the following table are given, for the various sections of the Climatological Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.							Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.					Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.			Station.	Amount.	Station.	Amount.
Alabama	48.8	+ 2.5	Spring Hill	81	2	Riverton	14	5	5.04	−0.40	Spring Hill	9.20	Union Springs	2.60
			Wetumpka	81	4									
Arizona	52.9	+ 3.8	Casagrande	93	17	Flagstaff (a)	10	28	0.68	−0.57	Flagstaff (a)	2.08	4 stations	0.00
						Seligman	10	28			Natural Bridge			
Arkansas	44.9	+ 4.0	Warren	83	10	Harrison	4	6	2.77	−0.89	Pocahontas	5.45	Dodd City	0.29
California	53.3	+ 5.0	Craftonville	98	6	Summit	2	26	4.14	+0.51	Monumental	21.08	Mammoth Tank	0.00
Colorado	35.0	+10.2	Holly	80	18, 19	Wagon Wheel Gap	−18	16	0.70	−1.40	Corona	6.39	4 stations	0.00
Florida	60.2	− 0.2	3 stations	90	28	Molino	25	9	1.45	−2.43	Bonifay	4.78	Flamingo	0.00
Georgia	48.9	+ 2.0	4 stations	81	26, 28	Lisbon	18	7	3.52	−2.16	Tallapoosa	7.73	Valdosta	0.12
						Toccoa	18	8						
Hawaii	69.6†	.....	Olaa Mill, Hawaii	93	2–4	Volcano House, Haw	45	5 dates	8.22‡	.....	Hakalau, Mauka, Ha	25.74	Puuwaawaa, Hawaii	2.29
Idaho	36.1	+ 7.2	Garnet	65	21	Forney	− 9	2	2.10	+0.08	Nevins Ranch	5.40	Lost River	0.23
			Hotspring	65	25									
Illinois	29.8	+ 3.3	Chester, Equality	72	13	Lanark	−20	6	0.55	−1.66	Cairo	3.58	2 stations	T.
Indiana	29.5	+ 0.7	Columbus, Rome	70	13	Salamonia	−11	6	0.48	−2.43	Princeton	2.25	3 stations	T.
Iowa	25.0	+ 5.8	St. Charles	65	16	Washta	−31	5	0.71	−0.32	2 stations	1.95	Stockport	0.06
Kansas	35.5	+ 5.4	Coldwater	82	17	Baker	−11	5	0.83	−0.34	Paola	2.20	6 stations	T.
Kentucky	35.7	+ 1.3	Burnside, Cadiz	73	13	Hopkinsville	−10	6	3.06	−0.61	Lynnville	6.06	Scott	0.66
Louisiana	55.7	+ 3.7	4 stations	86	3 dates	Minden	20	4, 5	3.74	−1.06	Donaldsonville	8.47	Minden	1.07
						Rayne	20	9						
Maryland and Delaware	28.0	− 3.5	Pocomoke City, Md	59	14	Oakland, Md	−29	7	2.38	−1.07	Annapolis, Md	3.55	Dover, Del	0.95
			Salisbury, Md	59	14									
Michigan	18.1	− 0.7	Coldwater	62	14, 19	Iron River	−42	4	0.65	−1.29	Harrisville	1.92	2 stations	0.10
Minnesota	14.8	+ 4.0	Lynd (No. 2)	56	17	Detroit	−32	4, 5	0.58	−0.13	Zumbrota	1.49	Beaulieu	T.
						Willow River	−52	4						
Mississippi	50.6	+ 2.8	Natchez	83	28	Hernando	13	6	4.72	−0.59	Shoccoe	8.61	Merrill	2.12
Missouri	34.8	+ 4.8	Dean	77	12	Louisiana	−15	6	1.65	−1.16	Caruthersville	5.37	Glasgow	0.05
Montana	25.9	+ 4.8	Billings	67	24	Plentywood	−48	4	0.93	+0.14	Snowshoe	6.44	2 stations	0.00
Nebraska	30.0	+ 6.0	Alma, Beaver City	73	17	Winnebago	−32	8	0.71	+0.02	Beatrice	2.34	2 stations	0.00
Nevada	41.9	+ 9.0	Logan	78	14, 15	McAfee's Ranch	9	27	1.28	−0.03	Clover Valley	8.14	Wadsworth	0.00
New England*	15.9	− 6.9	Gardiner, Me	55	18	Van Buren, Me	−37	19	2.08	−1.63	Eastport, Me	4.59	Storrs, Conn	0.37
New Jersey	23.6	− 6.2	Lakewood	55	14	Charlotteburg	−22	7	2.67	−1.19	Rivervale	3.90	Bridgeton	1.82
			Toms River	55	14	Layton								
New Mexico	43.9	+ 6.6	Mountainair	85	9	Winsors	7	28	0.26	−0.46	Chama	1.70	13 stations	0.00
New York	16.3	− 5.3	Hunt	54	14	Faust	−30	23	1.45	−1.09	Scarsdale	4.59	Hemlock Lake	0.32
North Carolina	40.0	− 1.7	Newbern	74	2	Buck Spring	5	6, 7	3.40	−1.16	Selma	7.95	Buck Spring	0.55
North Dakota	10.7	+ 4.3	Fort Yates	58	17	Williston	−49	4	0.27	−0.25	Gladys	1.42	2 stations	0.00
Ohio	26.0	− 0.8	Cincinnati, Ironton	66	13	Amesville	−19	6	0.85	−1.81	Ironton	2.09	Hedges	T.
Oklahoma and Indian Territories.	43.9	+ 5.5	Hooker, Okla., Temple, Okla.	90	18	3 stations	4	4	0.50	−0.41	Fort Reno, Okla	3.00	4 stations	0.00
Oregon	42.9	+ 5.2	Williams	89	22	Granite, Sumpter	6	2	5.56	+0.11	Gold Beach	18.66	Grass Valley	0.48
Pennsylvania	22.8	− 4.8	Grove City	56	27	Pocono Lake	−20	7	1.91	−1.31	Coatesville	4.37	Erie	0.66
			Lycippus	56	14									
Porto Rico	71.2	.....	Central Aguirre	95	26	Cayey	44	11	3.98	.....	Morovis	9.13	Humacao	0.29
South Carolina	45.1	− 0.7	Batesburg	84	19	Dillon	16	9	3.63	−1.08	Society Hill	5.69	Charleston	1.61
South Dakota	21.4	+ 6.4	Chamberlain	70	17	Frederick	−37	5	0.52	−0.02	Bowdle	1.20	3 stations	0.15
			Marion	70	17, 18									
Tennessee	40.8	+ 1.8	Cedar Hill	74	13	Springville	− 8	6	4.12	−0.38	Franklin (near)	6.27	Jonesboro	1.97
			Dover	74	13, 18									
Texas	53.7	+ 5.0	Fort McIntosh	98	20	3 stations	7	3, 4	1.25	−0.36	Danevang	5.67	17 stations	0.00
Utah	40.4	+11.2	Green River	86	15	Pinto	− 3	28	1.95	+0.84	Huntsville	7.23	Fort Duchesne	T.
Virginia	33.4	− 2.5	Cape Henry	68	14	Dale Enterprise	−16	7	2.42	−1.03	Big Stone Gap (a)	4.56	Lynchburg	0.78
			Lynchburg	68	28									
Washington	37.2	+ 1.5	3 stations	66	3 dates	Northport	− 6	2	4.33	+0.45	Clearwater	21.67	Rock Lake	0.00
						Ruby Hill	− 6	4						
West Virginia	31.1	0.0	Logan	68	2	Bayard	−23	7	2.55	−0.84	Pickens	4.83	New Cumberland	0.67
Wisconsin	19.4	+ 4.3	Mount Horeb	56	26	Hayward	−50	4	0.49	−0.68	Weyerhauser	1.64	Appleton	0.06
						Solon Springs	−50	4						
Wyoming	28.3	+ 8.7	Pine Bluff	70	11	Moorcroft	−30	1, 3	0.95	+0.16	Daniel	4.70	Riverton	T

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. † 48 stations, with an average elevation of 616 feet. ‡ 148 stations.

DESCRIPTION OF TABLES AND CHARTS.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

For description of tables and charts see page 30 of REVIEW for January, 1907.

TABLE I.—*Climatological data for U. S. Weather Bureau stations, February, 1907.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.									Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							**73.8**	**— 7.6**										**72**	**2.19**	**— 1.2**								**5.2**		
Eastport	76	69	85	29.89	29.98	.00	15.2	— 6.8	42	14	24	—12	23	7	36	14	10	78	4.59	+ 0.9	19	10,216	w.	50	ne.	5	7	7	14	6.5	44.5
Portland, Me.	103	81	117	29.91	30.05	+ .03	16.6	— 8.0	42	14	25	—10	23	8	31	14	7	67	2.95	— 0.5	13	6,760	nw.	42	nw.	25	10	8	10	5.4	30.6
Concord	288	70	79	29.72	30.05	+ .01	15.4	— 8.0	48	14	26	—12	24	5	37	....	....	....	0.85	— 2.4	8	4,365	nw.	31	nw.	25	18	5	5	3.0	13.9
Burlington	404	12	47	29.61	30.09	+ .06	11.4	— 8.0	39	14	20	—13	13	2	37	....	....	....	0.67	— 0.8	10	9,358	nw.	55	se.	14	10	10	8	5.2	9.9
Northfield	876	16	70	29.07	30.07	+ .03	9.8	— 6.2	47	14	21	—18	24	—2	40	7	3	81	0.71	— 1.6	10	6,302	n.	44	nw.	25	8	9	11	5.9	8.4
Boston	125	115	188	29.91	30.06	+ .02	21.6	— 6.4	52	14	30	— 2	23	13	30	19	11	66	1.88	— 1.6	13	7,884	w.	35	nw.	25	8	6	14	6.1	25.5
Nantucket	12	14	90	30.01	30.02	— .02	25.4	— 5.6	44	14	32	2	23	19	26	24	19	77	3.12	+ 0.2	13	11,750	w.	70	ne.	5	10	10	8	5.6	17.0
Block Island	26	11	46	30.03	30.06	.00	24.4	— 6.4	45	14	31	2	12	17	30	22	17	73	2.20	— 2.2	10	14,333	nw.	64	ne.	5	12	10	6	4.8	10.8
Narragansett	....	9	....	....	....	....	22.5	— 6.6	46	3	33	— 6	23	12	37	....	....	....	2.02	— 2.5	9	....	nw.	....	....	....	16	5	7	....	17.0
Providence	160	57	67	29.88	30.07	+ .02	21.4	— 7.7	49	14	31	— 4	23	12	31	18	12	69	2.36	.....	13	5,718	w.	30	w.	3	11	10	7	4.9	26.2
Hartford	159	122	132	29.90	30.09	+ .03	20.0	— 7.6	46	14	29	— 4	24	11	29	17	10	69	2.48	.....	9	4,500	nw.	32	nw.	25	6	12	10	5.6	25.8
New Haven	106	116	155	29.96	30.09	+ .02	21.8	— 7.0	42	14	31	— 3	12	13	33	19	12	67	2.91	— 1.2	8	6,722	nw.	35	w.	3	14	8	6	4.5	24.2
Mid. Atlantic States.							**28.6**	**— 6.2**										**72**	**2.26**	**— 1.1**								**5.0**		
Albany	97	102	115	30.00	30.12	+ .05	17.1	— 7.1	40	14	26	— 8	7	8	32	15	12	82	1.15	— 1.5	7	6,005	nw.	34	s.	24	7	11	10	5.7	10.8
Binghamton	875	79	90	29.12	30.10	+ .02	17.4	— 5.3	46	14	27	— 8	28	8	38	....	....	....	1.51	— 0.8	11	4,789	nw.	34	w.	3	6	7	15	6.6	17.7
New York	314	108	350	29.75	30.10	+ .02	24.4	— 7.1	44	14	32	1	12	17	29	22	16	71	2.52	— 1.3	8	9,357	nw.	48	w.	3	9	11	8	5.0	21.1
Harrisburg	374	94	104	29.72	30.15	+ .06	23.3	— 9.2	44	16	31	3	7	16	24	20	14	71	1.81	— 1.0	9	5,363	nw.	32	w.	11	13	7	8	4.7	18.5
Philadelphia	117	116	184	30.00	30.13	+ .03	27.0	— 6.5	50	14	34	8	12	20	23	24	18	67	2.75	— 0.4	10	7,739	nw.	38	ne.	5	12	9	7	4.6	24.1
Scranton	805	111	119	29.20	30.11	+ .03	20.6	.....	47	2	29	— 4	7	12	31	17	11	69	1.60	.....	11	4,919	sw.	28	nw.	10	7	12	9	5.6	15.3
Atlantic City	52	37	48	30.06	30.12	+ .01	27.4	— 6.5	46	14	35	6	12	20	28	25	20	74	2.93	— 0.4	8	6,186	nw.	41	ne.	5	14	6	8	4.6	10.4
Cape May	17	48	52	30.13	30.15	+ .04	28.2	— 7.5	44	14	35	11	7	22	28	26	....	....	2.55	— 1.2	8	6,596	nw.	30	n.	5	11	9	8	4.8	16.4
Baltimore	123	69	117	30.00	30.14	+ .03	28.8	— 7.4	54	14	36	9	7	22	26	24	16	60	1.93	— 1.6	8	5,011	nw.	30	w.	14	13	3	12	5.1	15.9
Washington	112	59	76	30.02	30.14	+ .03	30.2	— 5.6	58	16	39	8	7	21	29	25	20	71	2.31	— 1.1	7	3,577	nw.	31	nw.	14	16	5	7	4.5	15.4
Cape Henry	18	11	58	30.09	30.11	.00	36.2	— 7.7	65	19	43	19	23	30	31	....	....	....	3.18	— 0.4	12	10,570	n.	40	n.	4	10	11	7	4.8	1.5
Lynchburg	681	83	88	29.36	30.13	+ .02	35.8	— 4.2	68	2	45	9	7	26	34	30	24	68	0.78	— 2.8	5	3,396	nw.	26	nw.	14	10	9	9	5.3	5.5
Mount Weather	1,725	10	57	28.20	30.13	+ .02	23.6	.....	54	2	32	1	23	15	31	21	17	79	1.51	.....	7	13,153	nw.	68	nw.	14	18	5	5	3.8	5.7
Norfolk	91	102	111	30.03	30.14	+ .03	37.1	— 5.7	67	14	45	19	7	29	34	32	26	70	4.01	+ 0.2	14	6,561	n.	39	sw.	14	9	10	9	5.1	3.8
Richmond	144	145	153	29.99	30.16	+ .05	35.0	— 5.7	65	2	44	12	7	26	30	....	....	....	2.30	— 1.2	8	5,485	n.	36	s.	14	16	6	6	3.8	9.8
Wytheville	2,293	40	47	27.65	30.12	.00	33.2	— 1.9	59	2	42	5	7	25	37	29	25	79	1.91	— 1.5	9	4,607	w.	31	nw.	14	11	8	9	5.3	5.1
S. Atlantic States.							**46.1**	**— 2.6**										**77**	**2.54**	**— 1.2**								**5.2**		
Asheville	2,258	53	75	27.70	30.13	.00	37.6	— 2.5	67	2	47	17	6	29	38	34	31	83	1.12	— 2.5	8	6,178	nw.	33	nw.	11	9	7	12	6.0	0.2
Charlotte	773	68	76	29.27	30.13	+ .01	41.2	— 3.8	64	27	50	18	7	32	32	36	30	72	3.24	— 1.3	10	5,153	ne.	35	sw.	14	10	6	12	5.8	2.8
Hatteras	11	12	47	30.10	30.11	.00	43.2	— 3.4	64	19	50	28	23	36	33	40	37	85	2.89	— 1.6	11	11,339	ne.	48	n.	14	13	7	8	4.7	
Raleigh	376	71	79	29.72	30.14	+ .03	39.8	— 4.1	67	14	49	15	7	30	35	34	27	68	4.26	+ 0.5	10	4,215	n.	26	sw.	14	11	8	9	5.1	3.9
Wilmington	78	81	91	30.04	30.13	+ .01	44.8	— 5.0	73	2	54	21	7	36	28	39	34	75	2.64	— 0.6	9	5,556	ne.	25	sw.	14	10	10	8	5.1	
Charleston	48	14	92	30.07	30.12	.00	50.0	— 2.8	69	2	57	27	7	43	25	45	42	82	1.61	— 1.7	11	7,345	sw.	35	ne.	23	11	4	13	5.1	
Columbia, S. C.	351	41	57	29.73	30.13	+ .02	45.7	— 2.4	68	19	55	22	7	36	33	41	37	77	3.65	— 0.5	10	5,201	ne.	36	sw.	14	8	10	10	6.0	0.6
Augusta	180	89	97	29.92	30.12	.00	47.4	— 3.0	71	2	58	26	7	37	35	41	36	74	3.69	— 0.3	7	4,412	nw.	29	w.	21	12	6	10	5.3	
Savannah	65	81	89	30.05	30.12	.00	53.1	— 1.2	76	2	61	29	9	45	29	46	41	75	1.74	— 1.3	7	5,394	n.	33	w.	14	12	4	12	5.2	
Jacksonville	43	101	129	30.07	30.12	.00	58.2	— 0.2	77	26	67	33	9	49	28	51	48	80	0.55	— 2.6	6	6,058	sw.	38	sw.	4	12	14	2	4.2	
Florida Peninsula.							**63.6**	**— 1.5**										**78**	**0.38**	**— 2.1**								**3.2**		
Jupiter	28	10	48	30.08	30.11	+ .03	65.1	— 2.0	84	5	74	49	18	56	25	60	57	81	0.08	— 2.6	2	7,026	nw.	30	se.	24	13	14	1	4.3	
Key West	22	10	53	30.07	30.09	+ .02	69.8	— 1.6	80	5	75	58	21	65	18	63	60	76	0.20	— 1.4	6	6,189	ne.	33	w.	20	15	12	1	3.1	
Sand Key	25	41	71	30.06	30.09	+ .02	70.3	.....	78	1	73	61	9	68	11	....	....	....	0.39	.....	4	9,866	e.	37	nw.	20	20	8	0	2.9	
Tampa	35	79	96	30.09	30.13	+ .03	62.0	— 0.8	80	23	72	37	9	52	33	54	50	77	0.86	— 2.2	2	4,668	w.	29	sw.	4	22	2	4	2.5	
East Gulf States.							**52.0**	**+ 0.4**										**73**	**4.86**	**+ 0.1**								**5.0**		
Atlanta	1,174	190	216	28.86	30.13	+ .01	44.1	— 3.9	70	13	53	22	6	36	30	39	33	70	4.63	0.0	10	8,991	nw.	44	nw.	14	10	5	13	5.4	1.3
Macon	370	55	66	29.73	30.13	+ .01	49.2	+ 1.2	74	2	60	28	9	39	35	....	....	....	3.07	— 1.5	8	3,193	nw.	21	nw.	14	12	8	8	4.9	
Thomasville	273	8	57	29.83	30.13	+ .01	56.1	+ 2.7	79	3	67	28	16	45	37	48	45	80	1.49	— 3.5	6	3,996	s.	41	sw.	4	11	6	11	4.9	
Pensacola	56	79	96	30.07	30.13	+ .02	57.2	+ 0.4	73	27	64	32	6	50	24	....	....	....	3.86	0.0	5	5,998	sw.	28	n.	14	15	6	7	3.9	
Anniston	741	9	58	29.33	30.14	+ .02	45.7	+ 2.0	72	13	56	23	9	36	36	....	....	....	5.95	+ 1.1	9	4,249	n.	23	se.	24	10	3	15	6.0	0.3
Birmingham	700	136	144	29.35	30.13	+ .01	47.8	— 1.4	71	13	56	21	6	39	29	42	37	71	4.27	0.0	8	5,729	n.	42	se.	28	9	6	13	6.1	T.
Mobile	57	98	106	30.05	30.11	.00	56.4	+ 1.6	76	2	65	33	6	48	25	50	46	75	8.19	+ 3.5	9	5,202	s.	27	se.	19	14	2	12	4.6	
Montgomery	223	100	112	29.88	30.13	+ .01	52.1	— 0.6	75	2	52	28	6	43	33	46	40	73	4.51	— 0.8	7	4,709	sw.	30	n.	24	14	4	10	4.4	
Meridian	375	84	93	29.72	30.12	+ .01	50.6	0.0	75	2	66	27	5	40	37	45	40	73	8.39	+ 2.8	8	4,020	n.	20	se.	28	12	5	11	5.5	
Vicksburg	247	62	74	29.84	30.13	+ .03	53.0	+ 0.4	74	17	62	28	6	45	28	46	38	64	4.58	— 0.1	7	4,830	s.	24	se.	4	10	7	11	5.0	
New Orleans	51	88	121	30.06	30.11	+ .02	59.6	+ 1.5	78	24	68	36	6	52	27	54	49	76	4.47	— 0.1	8	5,400	n.	35	nw.	4	11	7	10	4.7	
West Gulf States.							**53.8**	**+ 2.3**										**70**	**1.90**	**— 1.4**								**4.6**		
Shreveport	249	77	84	29.84	30.12	+ .03	53.2	+ 2.0	79	21	64	28	6	43	36	46	38	65	2.00	— 2.2	6	4,673	s.	24	se.	28	15	6	7	4.0	
Bentonville	1,303	11	44	28.72	30.15	+ .05	40.6	.....	74	12	52	12	5	29	39	....	....	....	0.97	.....	7	4,626	n.	23	n.	21	13	5	10	5.0	1.3
Fort Smith	457	79	94	29.62	30.11	+ .01	44.8	+ 3.3	79	12	55	20	5	34	43	38	31	67	1.11	— 2.5	5	6,184	e.	35	sw.	13	12	9	7	4.7	T.
Little Rock	357	93	100	29.75	30.14	+ .03	46.0	+ 0.6	76	12	55	20	6	36	36	39	32	64	3.86	— 1.5	8	5,784	ne.	31	sw.	13	11	7	10	5.4	0.1
Corpus Christi	20	48	53	30.07	30.09	+ .04	60.6	+ 1.6	80	2	68	38	5	53	31	55	52	82	1.93	— 0.5	5	6,591	n.	26	se.	23	11	10	7	4.7	
Fort Worth	670	106	114	29.38	30.11	+ .04	51.9	+ 5.2	81	23	65	22	4	39	41	....	....	....	1.90	— 0.5	3	6,929	n.	32	nw.	18	10	12	6	4.6	
Galveston	54	106	112	30.05	30.11	+ .04	60.2	+ 3.2	74	17	65	40	5	55	19	56	55	88	2.09	— 0.9	5	6,089	se.	37	e.	25	6	14	8	5.7	
Palestine	510	73	79	29.54	30.08	.00	55.1	+ 4.1	80	21	66	30	5	45	32	47	40	66	1.51	— 2.0	6	5,439	n.	36	n.	27	11	7	10	5.1	
San Antonio	701	80	91	29.34	30.08	+ .03	58.6	+ 2.8	83	2	71	28	5	46	38	49	40	60	0.78	— 1.2	5	4,816	se.	30	n.	28	14	8	6	4.4	
Taylor	583	55	63	29.48	30.10	+ .04	55.4	.....	82	21	69	25	5	42	42	....	....	....	0.17	.....	5	6,266	n.	36	sw.	21	15	4	9	4.2	
Ohio Val. and Tenn.							**34.3**	**— 3.2**										**72**	**1.97**	**— 2.4**								**6.2**		
Chattanooga	762	106	112	29.32	30.16	+ .03	43.0	— 2.5	72	13	52	19	6	34	40	37	32	70	3.32	— 2.0	10	5,140	nw.	31	nw.	14	11	3	14	6.1	0.1
Knoxville	1,004	35	88	29.05	30.13	+ .01	39.7	— 2.6	68	13	48	16	6	31	39	35	29	73	3.19	— 2.1	10	5,380	sw.	31	w.	14	8	4	16	7.0	2.6
Memphis	399	76	97	29.72	30.15	+ .04	45.2	+ 0.4	72	18	53	17	6	37	29	40	34	71	2.60	— 2.7	11	6,426	ne.	30	n.	14	11	4	13	5.6	0.2
Nashville	546	79	91	29.56	30.16	+ .04	40.8	— 1.9	72	13	50	12	6	32	39	36	31	74	3.53	— 1.8	11	4,272	nw.	25	sw.	2	6	6	16	7.2	2.6
Lexington	989	75	102	29.05	30.16	+ .05	32.4	— 3.8	65	13	40	7	6	24	36	....	....	....	1.89	— 1.8	9	7,609	nw.	46	w.	14	9	7	12	6.2	8.7
Louisville	525	111	132	29.56	30.16	+ .05	35.2	— 3.0	69	13	44	9	6	27	39	30	26	74	1.25	— 3.1	9	5,937	n.	31	w.	14	11	8	9	5.3	6.3
Evansville	431	72	82	29.65	30.14	+ .03	35.8	.....	67	13	43	9	6	28	31	....	....	....	0.82	.....	8	5,051	e.	29	s.	13	8	13	7	5.8	9.8
Indianapolis	822	154	164	29.22	30.14	+ .04	30.0	— 2.3	62	13	37	6	3	22	36	26	20	71	0.18	— 3.4	6	6,842	nw.	35	sw.	13	7	13	8	5.7	0.6
Cincinnati	628	152	160	29.45	30.16	+ .06	31.9	— 4.5	66	13	40	9	6	24	39	27	21	67	0.76	— 2.9	11	5,316	nw.	28	w.	19	8	6	14	6.5	4.3
Columbus	824	173	190	29.22	30.13	+ .04	27.2	— 4.9	54	13	35	3	6	19	32	24	19	71	0.43	— 3.3	9	8,692	nw.	47	w.	10	7	11	10	5.9	3.5
Pittsburg	842	336	352	29.18	30.12	+ .03	26.4	— 7.0	54	14	36	3	12	17	37	23	18	71	0.74	— 2.1	10	7,502	nw.	48	w.	2	8	8	12	6.4	7.3
Parkersburg	638	77	84	29.46	30.14	+ .04	31.0	— 5.3	60	13	40	— 3	6	22	37	27	22	74	1.66	— 2.0	8	4,702	nw.	33	nw.	14	7	9	12	6.1	8.0
Elkins	1,940	41	50	27.99	30.15	+ .05	29.0	— 1.6	59	2	40	—14	7	18	43	25	20	77	2.87	— 1.2	16	3,344	w.	26	w.	10	3	12	13	7.2	9.9
Lower Lake Region.							**21.2**	**— 5.3**										**79**	**0.77**	**— 1.9**								**6.4**		
Buffalo	767	178	206	29.22	30.08	+ .02	19.4	— 5.1	50	14	28	— 4	12	11	38	18	15	84	1.32	— 1.5	17	11,054	w.	72	sw.	2	1	17	10	6.9	9.1
Canton	448	10	71	29.57	30.08	.....	10.4	.....	45	14	21	—20	18	0	44	....	....	....	0.89	.....	13	8,529	sw.	72	sw.	3	10	7	11	5.6	7.9
Oswego	335	76	91	29.70	30.09	+ .03	18.0	— 6.6	44	14	26	— 2	12	10	32	16	13	83	0.72	— 1.8	12	9,408	s.	52	w.	2	3	7	18	7.4	4.8
Rochester	523	81	102	29.50	30.10	+ .04	19.8	— 4.6	48	14	28	— 4	12	12	37	17	13	77	1.45	— 1.3	17	7,171	w.	48	sw.	2	3	12	13	7.2	15.7
Syracuse	397	97	113	29.42	30.10	+ .03	17.4	.....	45	14	26	— 5	23	9	32	....	....	....	1.00	.....	14	9,100	w.	56	w.	2	3	15	10	6.5	17.8
Erie	713	92	102	29.30	30.11	+ .04	21.3	— 6.2	54	13	29	2	23	14	41	19	15	79	0.66	— 2.8	12	8,755	w.	43	w.	2	3	11	14	6.8	5.2
Cleveland	762	190	201	29.26	30.12	+ .05	22.9	— 5.1	52	14	31	3	7	15	36	20	15	72	0.88	— 2.0	12	11,606	w.	60	w.	10	5	11	12	6.7	7.6
Sandusky	629	62	70	29.41	30.12	+ .05	23.9	— 5.0	52	13	31	2	6	17	31	....	....	....	0.33	— 2.6	6	6,419	sw.	36	nw.	14	9	6	13	6.0	3.0
Toledo	628	207	246	29.42	30.14	+ .07	23.4	— 4.8	53	13	31	1	22	15	33	21	17	78	0.22	— 1.8	6	9,886	nw.	50	w.	2	9	10	9	5.3	2.0
Detroit	730	153	193	29.30	30.12	+ .06	21.2	— 5.0	47	13	29	— 5	22	13	29	19	15	79	0.61	— 1.7	7	7,956	w.	38	sw.	2	7	10	11	5.7	5.8
Upper Lake Region.							**18.0**	**— 1.4**										**70**	**0.63**	**— 1.3**								**6.0**		
Alpena	609	13	92	29.40	30.10	+ .07	16.6	— 1.4	46	13	25	—11	4	8	32	14	11	81	0.58	— 1.5	16	8,268	nw.	36	nw.	10	4	12	12	6.5	5.9
Escanaba	612	40	82	29.42	30.12	+ .06	14.6	— 1.2	42	18	24	—17	4	5	36	13	8	77	0.63	— 1.0	9	6,944	nw.	42	n.	13	7	15	6	5.1	5.8
Grand Haven	632	54	92	29.40	30.12	+ .07	22.5	— 2.5	48	18	30	0	23	15	29	20	17	81	0.86	— 1.4	12	8,517	se.	50	w.	10	5	10	13	6.9	9.3

TABLE 1.—*Climatological data for U. S. Weather Bureau stations, February, 1907*—Continued.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max.+ mean min.÷2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
Up. Lake Reg—Cont.																													
Grand Rapids	707	121	162	29.32	30.13	+ .08	22.2	— 1.2	50	18	30	— 3	6	14	30	20	17	83	0.21	— 2.3	8	7,533	s.	40	w.	2	6	4	18	7.0	2.4
Houghton	668	66	74	29.34	30.10	+ .05	11.4	.....	46	13	22	—24	5	1	42	.....	.....	.....	0.81	.....	10	5,032	nw.	38	n.	2	6	12	10	6.2	7.6
Marquette	734	77	116	29.27	30.11	+ .06	14.8	— 2.3	50	13	23	—13	4	6	35	12	8	78	1.03	— 0.8	18	7,830	nw.	42	nw.	13	5	10	13	6.8	10.3
Port Huron	638	70	120	29.38	30.11	+ .06	18.6	— 4.4	43	13	27	— 4	22	10	29	17	13	79	0.42	— 2.0	8	8,619	nw.	48	nw.	11	10	5	13	5.9	7.4
Sault Ste. Marie	614	40	61	29.39	30.13	+ .10	8.6	— 3.9	37	13	19	—23	22	—2	42	8	5	84	0.98	— 0.3	10	6,232	nw.	50	nw.	24	5	9	14	6.5	9.8
Chicago	823	140	310	29.22	30.14	+ .06	26.4	— 0.4	53	13	33	— 2	4	19	37	24	20	77	1.00	— 1.3	5	9,952	nw.	50	nw.	2	6	14	8	5.7	10.0
Milwaukee	681	122	142	29.37	30.14	+ .08	23.6	+ 0.9	50	18	31	— 9	3	16	40	20	16	75	0.39	— 1.5	5	8,337	w.	34	w.	2	7	12	9	5.3	3.7
Green Bay	617	49	86	29.41	30.11	+ .05	19.0	+ 2.8	46	15	28	—14	4	10	38	15	10	73	0.08	— 1.7	3	7,483	sw.	44	w.	2	8	10	10	6.0	1.3
Duluth	1,133	11	47	28.82	30.11	+ .03	11.5	— 2.0	44	15	21	—28	3	2	39	10	6	80	0.71	— 0.4	6	10,959	nw.	54	nw.	13	12	9	7	4.6	7.5
North Dakota.							12.0	+ 4.8										80	0.36	— 0.2									4.4	
Moorhead	940	8	57	29.12	30.19	+ .08	10.8	+ 6.3	40	17	29	—34	4	1	32	10	8	89	0.38	— 0.4	6	6,811	nw.	33	nw.	13	11	9	8	4.5	3.6
Bismarck	1,674	8	57	28.33	30.22	+ .10	14.0	+ 4.5	50	17	24	—39	4	4	37	11	6	72	0.57	0.0	5	6,961	nw.	47	nw.	13	15	6	7	4.2	6.2
Devils Lake	1,482	11	44	28.49	30.16	+ .05	6.2	.....	40	17	17	—40	4	—4	39	4	0	78	0.33	.....	4	9,062	w.	46	w.	23	17	6	5	3.5	3.2
Williston	1,875	14	44	28.08	30.18	+ .07	11.2	+ 3.5	44	17	22	—49	4	1	41	9	6	83	0.13	— 0.3	5	6,168	sw.	40	w.	23	7	13	8	5.4	1.3
Upper Miss. Valley.							26.3	+ 1.5										78	0.77	— 1.1									5.4	
Minneapolis		102	208				17.4	+ 1.2	49	17	27	—22	5	8	28	.....	.....	...	0.76	— 0.3	6	8,983	nw.	46	nw.	13	14	7	7	4.0	11.6
St. Paul	837	171	179	29.19	30.14	+ .05	17.4	+ 1.6	48	17	27	—22	3	8	28	15	10	74	0.83	— 0.1	5	7,809	nw.	45	nw.	13	7	13	8	5.5	8.4
La Crosse	714	71	87	29.34	30.15	+ .04	20.9	+ 0.8	48	17	30	—20	6	12	42	.....	.....	...	0.31	— 0.8	4	5,891	s.	30	**nw.**	2	11	9	8	5.0	4.6
Madison	974	70	78	29.03	30.14	+ .04	21.2	+ 2.6	49	26	30	—13	3	13	39	18	14	79	0.28	— 1.3	6	7,793	nw.	34	w.	2	11	9	8	5.1	2.6
Charles City	1,015	8	58	29.03	30.17	+ .03	20.1	+ 2.3	50	17	29	—24	6	11	37	18	16	89	0.84	— 0.2	5	6,105	nw.	36	nw.	14	8	9	11	5.9	5.1
Davenport	606	71	79	29.47	30.16	+ .04	27.6	+ 2.3	58	18	36	— 6	5	19	33	24	19	76	0.22	— 1.4	3	5,651	nw.	34	nw.	2	11	5	12	5.4	4.6
Des Moines	861	84	101	29.23	30.18	+ .07	27.6	+ 4.5	56	17	36	—12	5	19	29	24	20	78	0.93	— 0.4	6	5,639	nw.	30	nw.	**2**	6	12	10	6.1	5.0
Dubuque	698	100	117	29.39	30.19	+ .10	23.9	+ 1.3	52	26	33	—14	6	15	40	21	17	80	0.52	— 0.9	9	5,070	nw.	27	nw.	13	13	6	9	4.8	6.8
Keokuk	614	64	77	29.48	30.18	+ .07	30.2	+ 1.9	62	18	38	— 6	5	22	27	26	22	77	0.10	— 1.6	4	5,089	nw.	30	nw.	2	9	10	9	4.8	1.3
Cairo	356	87	93	29.76	30.16	+ .04	38.8	— 0.6	70	13	47	10	6	31	28	35	31	79	3.58	— 0.4	9	6,675	n.	31	n.	2	4	9	16	7.1	3.6
La Salle	536	56	64	29.57	30.18	+ .10	26.9	.....	56	18	35	— 6	6	18	34	.....	.....	...	0.09	.....	3	5,852	nw.	36	w.	2	11	10	7	5.0	1.2
Peoria	609	11	45	29.47	30.16	+ .06	28.3	.....	59	18	37	— 9	6	20	31	24	20	77	0.14	.....	5	6,445	nw.	38	**nw.**	13	12	8	8	4.9	1.4
Springfield, Ill	644	10	92	29.44	30.15	+ .05	31.4	+ 1.1	65	13	39	0	5	24	32	27	23	75	0.30	— 3.1	5	6,377	nw.	31	nw.	14	11	3	14	5.6	3.2
Hannibal	534	75	109	29.56	30.16	+ .05	31.4	+ 0.9	66	18	40	— 6	6	23	32	.....	.....	...	0.25	— 1.7	4	6,309	**nw.**	34	nw.	18	10	7	11	5.9	3.5
St. Louis	567	208	217	29.52	30.15	+ .04	34.4	— 0.7	72	13	42	3	5	26	35	30	26	76	1.12	— 1.7	10	7,519	**nw.**	38	nw.	2	12	4	12	5.4	7.9
Missouri Valley.							28.1	+ 3.6										75	0.98	— 0.2									5.2	
Columbia, Mo	784	11	84	29.28	30.14	+ .03	32.5	+ 2.7	66	18	42	— 6	5	23	35	.....	.....	...	0.57	— 1.8	7	6,025	nw.	30	nw.	18	16	4	8	4.1	7.1
Kansas City	963	78	95	29.12	30.19	+ .08	33.4	+ 2.4	65	17	42	— 5	5	24	30	29	24	73	0.91	— 0.9	6	4,951	**nw.**	35	nw.	13	11	8	9	5.0	7.1
Springfield, Mo	1,324	98	104	28.68	30.13	+ .02	36.7	+ 2.0	71	18	46	4	6	27	35	32	26	73	1.80	— 1.2	11	7,334	se.	32	se.	27	11	9	8	4.7	1.4
Iola	984	40	47	29.08	30.17	+ .07	35.8	.....	68	17	47	2	5	25	38	.....	.....	...	0.41	.....	6	5,698	ne.	28	n.	2	9	8	11	6.1	0.1
Topeka	.....	85	89	.....	.....	.....	32.6	+ 1.3	67	17	43	— 4	4	22	35	.....	.....	...	1.47	— 0.2	7	5,914	nw.	30	nw.	13	13	8	7	4.9	4.5
Lincoln	1,189	11	84	28.85	30.17	+ .07	28.4	+ 3.2	63	17	38	—12	4	19	33	24	20	73	1.69	+ 0.8	9	6,946	n.	42	n.	1	11	10	7	4.8	9.9
Omaha	1,105	115	121	28.95	30.18	+ .07	27.8	+ 2.8	59	17	36	—12	5	19	32	24	19	73	1.45	+ 0.7	8	6,298	nw.	37	nw.	13	9	6	13	5.9	9.9
Valentine	2,598	47	54	27.36	30.18	+ .09	27.4	+ 5.9	67	17	40	—14	4	15	52	23	19	77	0.30	— 0.4	7	7,463	nw.	45	n.	1	10	10	8	4.9	3.0
Sioux City	1,135	96	164	28.90	30.17	+ .05	24.3	+ 5.3	60	17	33	—22	5	16	37	.....	.....	...	0.85	+ 0.3	6	9,440	nw.	52	nw.	1	8	8	12	5.9	11.3
Pierre	1,572	70	75	28.46	30.20	+ .09	23.2	+ 7.8	61	25	32	—16	3	14	31	19	15	75	0.45	+ 0.1	6	6,528	nw.	47	nw.	1	12	6	10	4.9	6.1
Huron	1,306	56	67	28.73	30.20	+ .08	18.8	+ 6.8	59	17	28	—22	5	10	34	16	14	83	0.44	0.0	10	8,364	nw.	43	s.	23	12	11	5	4.5	4.4
Yankton	1,233	49	57	28.80	30.17	+ .05	24.2	+ 5.0	64	17	34	—24	4	15	41	.....	.....	...	0.90	+ 0.2	6	6,264	nw.	44	nw.	1	7	8	13	6.4	12.0
Northern Slope.							27.5	+ 6.4										74	0.50	— 0.1									5.3	
Havre	2,505	11	44	27.39	30.16	+ .09	16.1	+ 2.9	50	16	26	—45	4	6	40	14	12	85	0.77	+ 0.2	7	6,256	nw.	38	sw.	7	10	11	7	5.3	7.7
Miles City	2,371	26	48	27.55	30.23	+ .14	21.2	+ 5.0	52	24	32	—22	3	10	35	17	13	77	0.34	— 0.2	8	3,382	ne.	30	ne.	23	12	8	8	4.6	1.9
Helena	4,110	8	56	25.85	30.18	+ .07	27.4	+ 5.7	55	8	36	—18	3	18	49	23	18	73	0.74	0.0	7	3,672	w.	48	w.	6	10	6	12	5.6	8.4
Kalispell	2,962	8	34	28.99	30.16	+ .03	25.4	.....	54	20	33	— 8	3	18	31	23	20	84	1.51	.....	9	2,422	w.	24	w.	1	1	13	14	7.3	9.6
Rapid City	3,234	46	50	26.64	30.18	+ .10	28.6	+ 8.0	61	24	40	—21	4	17	53	24	20	76	0.47	— 0.2	7	4,576	w.	38	n.	1	15	4	9	4.4	4.7
Cheyenne	6,088	56	64	24.00	30.09	+ .06	35.0	+ 7.7	62	11	47	— 9	3	23	47	28	20	62	0.49	+ 0.1	5	8,056	nw.	50	w.	1	12	8	8	4.5	4.9
Lander	5,372	26	36	24.65	30.12	+ .04	32.4	+ 9.4	58	8	46	— 9	3	18	41	27	21	67	0.12	— 0.6	4	2,235	sw.	24	nw.	23	10	10	8	5.1	0.9
Yellowstone Park	6,200	11	48	23.88	30.16	+ .06	26.8	.....	46	16	37	—14	2	16	45	22	17	66	0.58	.....	8	5,121	s.	27	s.	1	6	15	7	5.3	9.1
North Platte	2,821	11	51	27.16	30.19	+ .12	31.6	+ 6.3	69	17	45	— 8	3	19	42	25	21	77	0.51	+ 0.1	6	5,602	w.	44	n.	1	10	11	7	4.5	5.0
Middle Slope.							38.3	+ 5.9										82	0.53	— 0.2									4.3	
Denver	5,291	129	136	24.74	30.07	+ .06	40.3	+ 8.1	70	11	54	— 2	3	26	43	32	21	51	0.33	— 0.2	6	5,546	s.	42	w.	1	12	11	5	4.1	2.3
Pueblo	4,685	80	86	25.30	30.06	+ .06	40.9	+10.8	73	8	58	5	3	24	50	31	17	46	0.13	— 0.3	3	4,839	nw.	50	w.	1	14	12	2	3.2	0.2
Concordia	1,398	42	47	28.65	30.17	+ .08	32.4	+ 4.2	66	17	43	— 3	5	22	36	27	24	79	0.46	— 0.4	5	4,665	n.	24	nw.	2	10	11	7	4.7	3.1
Dodge	2,509	44	54	27.47	30.15	+ .09	37.0	+ 5.2	75	17	52	— 2	4	22	51	27	17	54	0.18	— 0.4	3	6,175	n.	36	n.	2	16	6	6	4.0	2.1
Wichita	1,358	78	86	28.70	30.18	+ .10	36.6	+ 4.8	71	17	48	0	4	25	35	31	26	72	1.53	+ 0.3	5	5,923	ne.	32	n.	18	13	7	8	4.7	2.2
Oklahoma	1,214	10	47	28.80	30.11	+ .04	42.7	+ 2.2	78	17	56	9	5	29	42	35	30	70	0.53	— 0.4	2	10,752	n.	48	n.	2	9	11	8	5.3	0.0
Southern Slope.							48.5	+ 7.7										56	0.08	— 0.9									3.5	
Abilene	1,738	45	54	28.27	30.10	+ .05	51.8	+ 5.9	83	23	68	16	4	36	44	41	31	57	0.00	— 1.4	0	5,231	**n.**	29	n.	2	11	14	3	3.9	0.0
Amarillo	3,676	10	49	26.29	30.08	+ .06	44.2	+ 8.6	74	8	60	7	3	29	42	34	24	62	0.24	— 0.6	1	7,789	s.	40	sw.	23	21	4	3	3.5	0.6
Del Rio	944	8	57	29.08	30.08	+ .08	59.3	.....	87	27	75	29	8	43	48	.....	.....	...	0.03	.....	3	4,801	se.	37	nw.	28	17	10	1	3.2	0.0
Roswell	3,578	9	57	26.36	30.02	+ .04	49.6	+ 8.5	77	9	68	19	4	32	54	39	27	50	0.00	— 0.6	0	4,477	s.	38	nw.	18	15	10	3	3.5	0.0
Southern Plateau.							50.7	+ 6.1										54	0.50	— 0.5									3.3	
El Paso	3,762	10	110	26.25	30.03	+ .08	54.8	+ 5.4	75	6	69	28	12	41	42	41	27	40	T.	— 0.4	0	6,974	nw.	44	ne.	7	16	9	3	2.8	0.0
Santa Fe	7,013	33	39	23.28	30.07	+ .09	39.8	+ 7.8	57	20	51	19	28	29	32	32	23	54	0.39	— 0.4	6	5,492	ne.	34	sw.	27	18	8	2	2.8	1.8
Flagstaff	6,907	12	44	23.39	30.04	+ .04	37.9	+ 7.3	59	6	50	10	28	26	38	31	25	66	2.08	— 1.2	6	4,218	e.	28	sw.	26	12	6	10	5.2	9.4
Phoenix	1,108	50	56	28.87	30.03	+ .04	59.2	+ 4.8	81	7	72	39	28	46	37	50	42	58	0.26	— 0.4	4	2,373	e.	30	w.	26	14	10	4	3.9	0.0
Yuma	141	16	46	29.88	30.03	+ .03	64.0	+ 5.4	86	13	78	38	28	50	34	52	40	48	0.10	— 0.4	1	4,235	n.	41	w.	26	22	4	2	2.2	0.0
Independence	3,910	11	42	26.07	30.09	+ .03	48.6	+ 5.8	69	14	61	30	1	36	32	41	31	55	0.56	0.0	3	3,780	nw.	36	n.	26	17	9	2	3.0	0.0
Middle Plateau.							42.4	+10.7										65	1.32	+ 0.2									4.9	
Reno	4,532	56	63	25.54	30.11	+ .03	45.4	+11.8	69	10	57	20	27	34	36	38	30	61	0.13	— 1.0	1	3,959	w.	36	w.	3	10	10	8	5.2	T.
Tonopah	6,089	12	20	24.13	30.16	.....	42.8	.....	57	4	50	21	27	36	21	36	28	60	0.41	.....	4	5,745	se.	34	nw.	26	11	14	3	4.7	0.5
Winnemucca	4,344	18	56	25.69	30.11	+ .02	43.9	+11.4	63	8	55	24	27	33	35	38	33	69	1.32	+ 0.4	10	5,321	ne.	29	sw.	1	10	5	13	6.0	0.3
Modena	5,479	10	43	24.68	30.09	+ .05	40.1	+10.8	60	13	52	20	8	28	40	34	29	71	0.73	— 0.9	5	6,425	w.	40	n.	27	11	8	9	4.9	T.
Salt Lake City	4,366	105	110	25.70	30.12	+ .04	42.9	+10.0	62	5	51	26	28	35	26	38	32	66	3.45	+ 2.2	13	3,336	se.	31	w.	25	13	5	10	5.0	0.5
Durango	6,546	18	56	23.69	30.09	+ .09	38.7	+ 8.2	58	5	52	13	28	26	35	31	23	62	1.22	— 0.2	6	3,674	nw.	26	s.	26	13	7	8	4.0	3.5
Grand Junction	4,608	43	51	25.46	30.08	+ .04	43.4	+12.1	61	16	55	24	28	32	32	36	29	63	1.06	+ 0.5	7	2,704	se.	23	se.	26	14	5	9	4.3	4.2
Northern Plateau.							38.4	+ 6.9										77	1.34	+ 0.2									6.7	
Baker City	3,471	48	58	26.50	30.14	+ .02	39.5	+10.0	58	20	47	24	1	32	27	36	31	73	1.25	— 0.5	10	3,813	se.	24	sw.	1	7	11	10	5.9	8.4
Boise	2,739	78	86	27.26	30.16	+ .04	43.1	+ 8.5	60	15	52	28	27	34	27	38	32	68	2.79	+ 1.2	10	3,096	se.	28	n.	1	12	3	13	5.6	3.6
Lewiston	757	10	51	29.33	30.16	+ .05	37.2	— 0.9	57	23	43	20	4	32	28	.....	.....	...	2.13	+ 1.0	13	2,702	e.	38	w.	1	2	7	19	8.2	10.9
Pocatello	4,477	46	54	25.56	30.15	+ .05	39.2	+16.2	55	13	48	22	28	30	29	34	30	73	1.71	— 0.1	7	6,304	se.	37	sw.	3	13	6	9	4.5	9.1
Spokane	1,929	101	110	28.06	30.16	+ .07	33.1	+ 4.6	55	22	39	11	4	27	28	31	29	86	1.40	— 0.6	10	3,335	sw.	25	s.	23	1	5	22	8.6	5.2
Walla Walla	1,000	71	79	29.08	30.18	+ .07	38.4	+ 3.0	61	20	44	14	4	32	37	37	35	87	1.76	+ 0.4	9	3,575	s.	30	se.	24	3	11	14	7.2	8.6
N. Pac. Coast Reg.							43.6	+ 3.1										85	5.06	— 0.6									7.1	
North Head	211	11	56	29.84	30.07	+ .01	45.8	+ 4.1	63	9	50	34	1	42	19	44	42	87	4.61	— 1.7	18	10,784	se.	65	se.	24	8	9	11	5.5	0.0
Port Crescent	259	12	29	29.78	30.07	+ .04	39.0	+ 1.2	52	5	45	24	3	34	21	.....	.....	...	5.81	+ 1.1	17	3,917	ne.	33	ne.	2	1	11	16	7.8	3.3
Seattle	123	185	224	29.98	30.12	+ .06	41.8	+ 0.4	54	8	46	28	3	37	18	40	38	86	3.87	+ 0.2	15	5,573	**n.**	53	s.	5	1	10	17	8.1	3.1
Tacoma	213	113	120	29.86	30.10	+ .04	42.4	+ 3.5	58	7	47	29	3	38	20	.....	.....	...	4.12	— 1.2	14	4,028	sw.	28	sw.	5	1	2	25	9.0	5.0
Tatoosh Island	86	7	57	29.94	30.04	+ .04	42.8	+ 2.0	52	7	46	27	3	40	12	42	40	88	8.51	0.0	20	14,599	**e.**	63	s.	7	5	5	18	7.3	1.4
Portland, Oreg	153	68	106	29.94	30.10	+ .02	45.2	+ 4.0	60	6	51	28	3	39	20	42	39	78	3.54	— 2.6	12	4,086	**se.**	26	sw.	5	7	7	14	6.4	3.5
Roseburg	510	9	57	29.55	30.11	+ .01	48.5	+ 6.4	65	19	56	31	27	41	24	46	44	84	4.96	+ 0.1	9	1,563	s.	18	s.	2	9	7	12	5.9	0.2

TABLE I.—*Climatological data for U. S. Weather Bureau stations, February, 1907*—Continued.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.									Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.				
Mid. Pac. Coast Reg.							**53.6**	**+ 4.4**										**83**	**4.23**	**+ 0.1**									**7.3**
Eureka	62	62	80	30.07	30.14	+ .03	51.1	+ 4.7	65	23	55	35	27	47	19	50	48	89	10.57	+ 4.1	13	3,278	sw.	24	sw.	1	2	7	19	8.1	
Mount Tamalpais	2,375	11	18	27.65	30.14	+ .04	50.8	.....	67	10	55	33	26	47	13	46	42	76	4.77	.....	11	10,997	w.	55	w.	24	5	5	18	7.4	
Point Reyes Light	490	7	18	29.56	30.08	.....	53.0	+ 3.7	66	9	57	43	26	49	17	....	....	....	2.20	— 1.6	12	10,398	nw.	56	nw.	25	4	8	16	7.2	
Red Bluff	332	50	56	29.74	30.10	— .01	55.0	+ 6.0	80	15	63	38	27	47	30	51	48	80	3.28	— 0.4	11	4,089	se.	26	nw.	25	5	8	15	7.2	
Sacramento	69	106	117	30.05	30.12	+ .03	54.0	+ 4.2	67	15	60	43	28	48	21	51	49	84	2.37	— 0.8	9	4,827	se.	24	se.	2	4	8	16	7.3	
San Francisco	155	200	204	29.96	30.13	+ .03	54.9	+ 3.2	68	15	60	43	26	50	16	52	49	84	3.02	— 0.7	8	3,618	nw.	27	sw.	1	7	6	15	6.8	
San Jose	141	78	88	29.98	30.13	.....	55.0	.....	68	6	64	34	27	46	27	....	....	....	1.88	.....	11	.....	nw.	.....	.....	.....	4	9	15	6.7	
Southeast Farallon	30	9	17	30.10	30.13	.....	52.6	.....	58	13	56	47	25	50	10	....	....	....	1.70	.....	10	8,309	nw.	48	nw.	26	6	3	19	7.4	
S. Pac. Coast Reg.							**58.4**	**+ 5.0**										**74**	**1.42**	**— 1.2**									**5.2**
Fresno	330	67	70	29.77	30.14	+ .06	53.9	+ 3.7	67	10	62	35	27	46	26	50	47	79	0.94	— 0.2	4	2,549	nw.	24	nw.	26	2	8	18	7.3	
Los Angeles	338	116	123	29.70	30.06	— .00	61.8	+ 7.4	84	7	71	40	27	52	26	53	46	63	1.83	— 1.4	5	3,135	ne.	26	sw.	26	9	9	10	5.5	
San Diego	87	94	102	29.96	30.05	— .01	60.1	+ 5.4	84	8	68	41	28	52	28	53	48	72	0.45	— 1.8	5	3,410	nw.	27	se.	22	19	7	2	3.0	
San Luis Obispo	201	47	54	29.90	30.11	.00	57.8	+ 3.5	84	7	68	37	28	47	37	53	50	80	2.45	— 1.3	6	3,187	n.	23	nw.	4	10	11	7	4.8	
West Indies.																														
Grand Turk	11	6	20	30.05	30.06	.....	74.4	.....	84	12	81	60	19	70	.....	....	....	....	1.67	.....	10	.....	e.	.....	.....	.....	.....	.....	.....	.....	
San Juan	82	48	90	29.94	30.03	— .02	73.4	— 1.8	84	21	79	63	11	68	16	68	66	79	2.82	+ 0.4	14	6,347	e.	31	e.	24	16	6	6	3.8	
Panama.																														
Ancon	74	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Naos	40	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	

TABLE II.—*Climatological record of cooperative observers, February, 1907.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alaga	....	....	....	3.02	
Ashville	69	22	45.2	5.50	T.
Auburn	70	27	50.8	4.37	
Benton	....	....	....	5.15	
Bermuda	75	27	53.1	6.15	
Boligee	76	25	50.6	5.27	
Bridgeport	....	....	....	3.85	
Camphill	74	24	48.6	5.06	
Cedar Bluff	....	....	....	4.83	0.6
Citronelle	78	29	56.4	6.59	
Clanton	73	22	49.0	5.08	
Cordova	75	21	47.2	4.61	T.
Dadeville	....	....	....	2.72	
Daphne	76[3]	32[3]	57.2[3]	4.25	
Decatur	76	15	43.0	6.39	0.8
Demopolis	....	....	....	7.82	
Eufaula	74	26	50.4	2.67	
Flomaton	78	26	54.0	3.37	
Florence	72	16	44.8	4.93	5.0
Fort Deposit	73	27	51.8	5.10	
Gadsden	73	23	45.8	4.74	
Goodwater	78	23	49.2	5.57	
Greensboro	73	26	51.2	5.48	
Guntersville	....	....	....	4.96	1.5
Hamilton	75	19	46.2	3.82	1.8
Highland Home	75	27	52.9	3.80	
Letohatchie	....	....	....	4.66	
Livingston	73	25	50.0	6.02	
Lock No. 4	70	22	46.4	7.62	T.
Lucy	80	24	55.6	3.59	
Madison Station	....	....	....	3.26	1.0
Maplegrove	73	22	48.3	4.88	1.7
Milstead	....	....	....	3.52	
Newbern	77	25	50.6	6.34	
Oneonta	72	19	44.0	5.59	3.0
Opelika	75	25	50.7	5.03	
Prattville	76	25	51.0	4.52	
Pushmataha	78	25	50.4	7.25	
Riverton	72	14	42.6	5.62	3.2
Scottsboro	72	20	44.0	4.04	0.4
Selma	77	28	51.6	5.18	
Spring Hill	81[3]	33	58.4	9.20	
Talladega	75	21	48.6	6.67	
Tallassee	....	....	....	4.15	
Thomasville	79	25	51.0	4.34	
Tuscaloosa	74	23	45.6	3.59	
Tuscumbia	70	19	44.4	8.48	2.0
Tuskegee	75	27	52.6	3.44	
Union Springs	76	28	51.2	2.60	
Uniontown	76	26	53.2	7.45	
Valleyhead	72	18	42.3	2.68	T.
Vienna	....	....	....	4.82	
Wetumpka	81	26	52.2	3.48	
Alaska.					
Copper Center	42	—48	—11.2	0.60	6.0
Fort Egbert	30	—52	—20.0	0.20	2.0
Fort Liscum	36	— 9	15.8	10.14	95.0
Killisnoo	45	5	25.0	9.55	31.5
Loring	41	—10	26.2	13.03	19.2
Orca	40	5	22.2	8.48	100.0
Sitka	49	9	30.2	3.55	4.2
Skagway	42	— 3	18.0	4.85	.....
Wood Island	42	— 3	23.0	4.00	26.0
Arizona.					
Allaire Ranch	....	....	....	0.55	
Aztec	85	40	63.1	0.30	
Benson	77	30	53.4	0.62	
Bisbee	72	28	50.4	0.38	T.
Bonita	....	....	....	0.70	
Bowie	78	30	53.4	0.60	
Buckeye	80	30	56.4	0.09	
Casagrande	93	24	57.2	0.00	
Chlarsons Mill	49	19	32.0	1.60	4.0
Clifton	....	....	....	0.80	T.
Cline	77	30	54.4	1.05	
Cochise[4]	62	35	51.0	0.20	
Columbia	77	32	53.2	1.00	T.
Congress	77	33	57.9	0.43	
Douglas	79	27	53.2	0.31	T.
Dudleyville	79	33	55.2	0.48	
Fort Apache	72	15	44.2	0.72	1.5
Fort Huachuca	72	22	49.7	0.70	
Fort Mohave	84	40	63.5	0.55	
Fredonia	70	14	46.8	0.85	5.0
Gilabend	81	35	61.4	0.00	
Globe	74	33	53.0	1.08	
Grand Canyon	61	20	45.0	2.02	14.0
Greaterville	72	25	48.4	0.50	T.
Greer	....	....	....	0.60	6.0
Holbrook	66	21	44.6	0.44	0.5
Huachuca Reservoir	....	....	....	1.23	
Intake Dam	....	....	....	0.35	
Jerome	70	28	51.2	1.70	7.0
Keams Canyon	62	22	41.6	0.98	2.5
Kingman	77	28	53.2	1.41	1.5
Maricopa	84	32	56.6	0.22	
Mesa	83	35	57.9	0.81	
Mohawk Summit	85	45	64.6	0.00	
Natural Bridge	....	....	....	2.08	3.0
Nutrioso	....	....	....	0.51	5.0
Oracle	70	39	54.4	0.25	
Paradise	73	28	48.7	0.48	0.5
Parker	89	28	58.0	0.00	
Phoenix (Ex. Farm)	81	34	57.4	0.39	
Picacho	80	46	62.2	T.	
Pinal Ranch	....	....	....	1.25	4.0
Pinto	....	....	....	0.95	2.0
Roosevelt	73	36	55.0	1.01	
St. Michaels	57	14	37.4	0.79	4.5
San Carlos	81	29	53.8	0.24	T.
San Simon	74	29	49.8	0.01	T.
Seligman	72	10	45.2	0.22	2.0
Showlow	....	....	....	0.93	3.0
Silverbell	76	37	60.7	0.24	
Tempe	81	34	57.2	0.57	
Thatcher	80	24	51.7	0.30	
Tombstone	70	30	51.8	0.61	
Tuba	69	22	45.4	0.38	2.7
Tucson	82	27	56.0	0.75	
Vail	89	48	68.0	0.20	
Walnut Grove	....	....	....	1.00	T.
Willcox	73	26	49.8	0.80	
Yarnell	....	....	....	1.12	3.0
Young	77	25	50.0	1.45	
Arkansas.					
Alicia	70	10	42.3	2.40	T.
Amity	80	21	47.0	4.21	1.0
Arkadelphia	79	24	47.2	3.24	1.0
Arkansas City	....	....	....	3.10	
Batesville	74	12	43.6	3.46	1.0
Beebranch	76	16	44.2	0.40	
Black Rock	....	....	....	3.27	2.0
Brinkley	78	20	44.8	3.31	1.0
Calico Rock	....	....	....	1.74	0.5
Camden	79	26	50.1	2.18	
Center Point	80	22	49.2	1.81	1.0
Clarendon	....	....	....	4.46	0.2
Conway	76	18	43.9	3.71	0.9
Corning	72	14	40.8	5.26	2.8
Dardanelle	....	....	....	2.06	
Des Arc	82	19	46.2	3.25	1.0
Dodd City	76	7	40.8	0.29	1.5
Dutton	73	16	40.9	1.70	T.
Earl	71	18	44.6	2.97	
Eldorado	79	25	50.7	3.61	
Eureka Springs	74	14	41.0	1.16	T.
Fayetteville	74	13	43.0	....	....
Forrest City	69	17	44.2	3.78	1.0
Fulton	....	....	....	1.52	
Hardy	73	10	41.3	3.78	0.9
Harrison	75	4	38.8	1.25	0.9
Helena	73	19	47.8	3.94	T.
Hope	81	24	50.1	2.46	
Hot Springs	76	20	45.1	4.41	
Jonesboro	72	8	43.0	5.32	3.5
Junction	77	23	50.2	2.04	
La Crosse	73	8	42.0	2.88	0.5
Lewisville	80	23	48.9	.....	
Lutherville	74	18	42.5	2.76	
Luxora	....	....	....	4.37	T.
Malvern	74	21	43.0	4.35	0.5
Mammoth Springs	74	9	39.4	2.23	T.
Marked Tree	....	....	....	1.50	T.
Marvell	73	20	46.8	3.24	0.2
Mena	75	20	47.2	3.14	0.8
Montrose	79	25	49.8	2.57	
Mossville	73	12	41.5	0.30	T.
Mountain Home	74[3]	9[3]	39.8[3]	1.59	0.

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arkansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Mount Nebo	70	15	43.2	3.00	
Newport	73	13	41.0	1.46	0.5
Ozark	78	19	45.1	1.20	
Pinebluff	77	22	46.0	3.11	
Pocahontas	76	10	44.0	5.45	2.3
Pond	78	10	40.7	0.76	0.5
Prescott	78	24	47.6	2.85	
Princeton	79	24	47.9	1.87	
Rogers	77	12	41.6	1.05	0.8
Spielerville	78	21	44.8	2.12	
Stuttgart	74	20	45.8	3.97	0.4
Texarkana	81	20	52.2	1.70	
Warren	83	23	50.2	2.53	
White Cliffs	.....	.....	.....	2.82	
Wiggs	78	19	45.2	4.28	
Witts Springs	.....	.....	.....	1.27	T.
California.					
Alturas	66	21	42.8	2.87	T.
Auburn	69	44	55.6	9.70	
Azusa	85	32	59.4	2.97	
Bagdad	79	44	61.6	0.60	
Bakersfield	78	43	59.1	0.76	
Bear Valley	.....	.....	.....	11.10	10.0
Berkeley	66	39	54.7	5.36	
Bishop	76	21	46.8	0.15	
Blocksburg	75	29	50.4	14.35	
Blue Canyon	70	30	48.4	17.95	7.0
Bowman	.....	.....	.....	12.68	9.0
Branscomb	74	25	49.7	20.34	.....
Brush Creek	70	26	48.4	11.47	
Butte Valley	.....	.....	.....	6.78	0.3
Calexico	82	42	62.0	0.21	
Campbell	67	34	54.2	1.50	
Campo	.....	.....	.....	1.67	
Cedarville	62	20	41.8	3.70	6.0
Chico	76	31	53.2	2.09	
Claremont	86	34	59.1	3.42	
Cloverdale	73	34	55.4	5.33	
Colfax	78	22	49.9	9.75	
Colusa	70	35	54.2	0.75	
Crockers	.....	.....	.....	5.82	
Cuyamaca	60	24	41.6	3.22	
Delta	89	30	56.3	9.21	
Dimond	.....	.....	.....	5.62	
Dobbins	82	40	55.4	8.98	
Durham	75	32	54.1	2.09	
Elcajon	89	34	59.1	0.83	
Electra	73	36	56.4	5.15	
Elmwood	72	36	56.0	0.60	
Elsinore	92	28	57.8	2.24	
Emigrant Gap	68	12	40.2	14.45	14.0
Escondido	83	28	56.2	1.60	
Folsom	74	34	54.0	5.65	
Fordyce	.....	.....	.....	11.26	26.0
Fort Bragg	.....	.....	.....	10.36	
Fort Ross	.....	.....	.....	11.56	
Georgetown	76	31	50.7	13.50	
Gold Run	86	18	45.2	9.61	
Greenville	67	20	43.9	4.48	2.0
Groveland	.....	.....	.....	3.70	
Hanford	67	25	51.5	0.65	
Healdsburg	79	33	56.0	4.14	
Heber	91	40	63.8	0.19	
Hollister	73	32	54.5	2.24	
Idyllwild	72	19	45.9	2.71	
Imperial	92	37	62.6	0.40	
Indio	90	38	64.5	0.63	
Iowa Hill	76	32	52.0	10.13	
Isabella	.....	.....	.....	0.85	
Jamestown	73	30	51.6	5.59	
Kennedy Gold Mine	.....	.....	.....	6.25	
Kentfield	.....	.....	.....	4.36	
Kernville	.....	.....	.....	0.76	
King City	83	36	55.9	0.81	
Laporte	68	19	41.8	16.40	7.0
Laytonville	.....	.....	.....	12.35	
Legrande	75	32	51.6	0.77	
Lemoncove	75	36	55.8	2.66	
Lick Observatory	64	23	48.2	4.76	
Livermore	75	32	55.0	1.86	
Lodi	69	33	54.6	2.82	
Lone Pine	70[b]	27	48.7[a]	0.31	
Los Gatos	70	37	54.9	2.11	
Lowe Observatory	.....	.....	.....	3.60	
Magalia	74	27	47.3	10.71	
Mammoth	87	38	62.5	0.00	
Marysville	70	43	56.8	4.30	
Mecca	89	40	62.0	0.34	
Merced	70	31	54.2	3.16	
Mercury	.....	.....	.....	5.29	
Mills College	.....	.....	.....	6.42	
Milo	.....	.....	.....	2.78	
Milton (near)	67	37	54.1	2.53	
Mohave	76	35	57.0	0.50	
Mokelumne Hill	72	34	53.6	6.29	
Mono Ranch	72	26	49.6	1.85	
Montague	67	24	45.6	2.88	
Monterio	74	28	52.5	3.44	
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Monumental	68	22	45.4	21.08	11.0
Mountainview	.....	.....	.....	1.69	
Mount St. Helena	.....	.....	.....	12.18	
Napa	67	37	54.2	4.44	
Nellie	.....	.....	.....	3.04	
Nevada City	80	26	49.4	8.22	
Newman	69[e]	35[e]	53.5[e]	1.49	
Niles	70	36	55.4	3.57	
Nimshew	67	26	50.5	13.12	
North Bloomfield	75	28	48.7	9.23	T.
Oakland	67	40	55.2	4.04	
Ojai Valley	87	32	59.2	2.03	
Orland	82	36	55.9	12.75	
Oroville (near)	73	34	54.0	3.59	
Ozena	.....	.....	.....	0.75	
Palermo	75	32	53.8	3.34	
Pilot Creek	.....	.....	.....	11.79	
Pine Crest	82	42	61.7	3.27	
Placerville	72	30	50.9	8.15	
Point Lobos	67	49	58.7	1.76	
Porterville	81	38	55.9	1.37	
Poway	84	32	57.4	1.13	
Priest Valley	.....	.....	.....	1.67	
Quincy	55	25	39.6	4.96	3.0
Redding	79	36	55.6	9.09	
Redlands	85	32	57.6	2.03	
Reedley	71	35	54.4	1.41	
Represa	.....	.....	.....	5.81	
Rialto	90	32	62.1	3.85	
Riovista	69	36	54.4	2.64	
Riverside	90	29	58.0	1.75	
Rocklin	73	31	53.8	5.71	
Rohnerville	72	32	52.4	7.27	
Sacramento	66	37	54.1	3.07	
Salinas	77	35	56.8	1.01	
San Bernardino	87	30	58.4	2.14	
San Jacinto	91	30	58.6	2.03	
San Leandro	76	32	57.2	5.31	
San Miguel Island	.....	.....	.....	1.94	
Santa Barbara	85	38	59.0	2.34	
Santa Clara College	71	32	55.3	2.02	
Santa Cruz	77	34	55.9	4.10	
Santa Maria	80	35	57.1	1.02	
Santa Monica	85	40	58.4	1.51	
Santa Rosa	71	30	53.8	5.17	
Shasta	85	35	56.2	7.89	
Sierra Madre	81	38	59.0	3.76	
Sisson	69	23	44.4	2.84	T.
Snedden	.....	.....	.....	1.50	
Sonoma	71	37	55.3	7.21	
Sonora	74	31	52.6	5.40	
Sterling	71	23	46.7	17.54	1.5
Stockton	67	38	53.8	2.52	
Storey	67	31	51.2	0.48	
Summerdale	70	21	44.0	6.81	8.0
Summit	59	2	35.1	4.38	26.0
Susanville	59	20	41.7	2.44	
Tamarack	55	16	34.8	3.00	30.0
Towle	80	27	47.3	12.24	1.5
Truckee	58	18	39.0	2.39	5.0
Tulare	72	36	54.1	1.07	
Tustin (near)	.....	.....	.....	2.85	
Ukiah	72	30	52.8	6.24	
Upland	80	34	58.8	3.19	
Upperlake	74	29	52.4	4.60	
Upper Mattole	.....	.....	.....	16.47	
Vacaville	73	36	54.2	3.08	
Ventura	82	42	58.0	2.18	
Visalia	78	33	50.4	1.07	
Wasioja	.....	.....	.....	1.35	
Westpoint	.....	.....	.....	6.66	T.
Wheatland	69	35	53.4	3.06	
Willetts	82	20	53.7	8.60	
Willows	73	34	54.3	1.02	
Woodleaf	.....	.....	.....	12.87	
Woodside	68	34	53.9	2.43	
Yosemite	65	24	42.1	3.72	1.0
Yreka	.....	.....	.....	4.13	.....
Zenia	73	24	49.0	16.99	
Colorado.					
Akron	.....	.....	.....	T.	T.
Alamosa	54	11	33.2	0.00	
Antelope Springs	48	—15	18.4	0.41	4.3
Arriba	71	— 2	36.6	T.	T.
Ashcroft	52	0	25.4	1.65	24.0
Blaine	76	3	38.0	T.	
Boulder	69	— 3	42.8	0.56	7.0
Breckenridge	51	— 3	24.7	1.82	25.0
Buena Vista	54	11	35.2	0.15	2.5
Burlington	74	— 2	37.2	T.	T.
Canyon	71	7	46.8	0.03	T.
Cascade	.....	.....	.....	3.91	39.0
Castlerock	66	0	34.6	0.18	2.5
Cheesman	64	10	38.6	T.	T.
Cheyenne Wells	74	0	36.8	T	T.
Chromo	59	3	30.3	0.98	6.0
Clearview	56	2	33.1	0.53	8.5
Collbran	60	15	39.2	1.72	7.2
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Colorado Springs	69	1	39.1	0.11	0.7
Cope	72	— 2	36.8	0.03	0.8
Corona	44	— 2	22.2	6.39	64.5
Crippleecreek	.....	.....	.....	0.06	1.2
Delta	64	15	41.4	0.53	
Dunkley	47	4	30.6	1.32	13.9
Eagle	53	12	35.0	0.77	5.2
Fort Collins	69	— 3	35.5	0.36	6.0
Fort Morgan	70	— 3	36.6	0.08	2.0
Fowler	.....	.....	.....	T.	
Frances	50	11	32.1	2.17	27.7
Fruita	65[e]	17[f]	41.2[f]	1.15	
Garnett	56	0	31.4	T.	
Gladstone	.....	.....	.....	4.28	57.9
Gleneyre	72	0	39.6	0.07	
Glenwood	58	16	35.0	0.68	5.0
Gothic	54	— 4	24.4	5.61	77.5
Grand Valley	61	20	41.8	1.30	1.0
Grover	.....	.....	.....	0.25	1.0
Gunnison	50	0	28.0	0.58	5.8
Hahns Peak	42	0	25.1	1.49	22.0
Hamps	73	— 1	35.8	T.	0.2
Hoehne	75	— 5	38.4	0.40	1.0
Holly	80	5	41.8	T.	T.
Holyoke (near)	70	— 6	33.6	T.	T.
Idaho Springs	67	7	38.1	0.50	5.3
Lake City	51	3	29.2	0.88	13.0
Lake Moraine	51	3	30.2	0.29	5.0
Lamar	77	5	41.2	0.00	
Laporte	.....	.....	.....	0.38	5.5
Las Animas	77	5	40.6	0.00	
Lay	52	9	33.4	0.94	8.0
Leroy	67	— 6	36.1	0.05	1.0
Lime Creek	.....	.....	.....	2.86	26.3
Longs Peak	49	1	29.7	1.52	23.0
Lujane	54	17	38.4	1.25	5.5
Manassas	60	10	34.4	0.02	0.4
Mancos	60	7	37.8	1.43	11.0
Meeker	56	15	37.2	0.60	4.0
Moraine	54	7	33.1	0.55	8.5
Pagoda	63	16	35.4	0.88	6.0
Pagosa Springs	56	6	32.4	1.10	7.0
Paonia	62	26	41.8	2.06	5.0
Platte Canyon	.....	.....	.....	0.34	1.5
Power House	58	10	38.8	1.26	13.1
Rangely	62	12	35.7	0.21	0.5
River Portal	49	18	34.6	1.57	2.5
Rockyford	78	5	39.8	T	
Saguache	60	6	35.0	0.02	0.2
Salida	62	13	39.0	0.60	5.0
San Luis	58	9	35.8	T.	0.1
Santa Clara	63	9	38.8	0.65	5.0
Sapinero	48	4	29.2	2.64	29.2
Sheridan Lake	78	0	36.5	T.	
Silt	58	17	39.4	0.54	1.0
Silverton	52	—12	24.7	2.69	25.5
Stonewall	.....	.....	.....	0.20	3.0
Trinidad	71	2	42.3	0.50	T.
Victor	59	11	38.2	0.06	0.9
Vilas	.....	.....	.....	0.00	
Wagon Wheel	52	—18	21.2	0.56	8.0
Waterdale	68	— 3	37.6	0.80	8.3
Westcliffe	59	7	34.6	0.07	1.5
Whitepine	41	— 2	22.4	2.13	32.0
Wray	72	— 2	36.4	0.02	0.8
Yuma	.....	.....	.....	0.02	0.4
Connecticut.					
Bridgeport	40	— 7	20.4	3.06	25.9
Canton	45	—16	16.1	2.18	22.0
Colchester	45	— 9	18.8	3.58	33.5
Falls Village	.....	.....	.....	1.76	17.4
Hawleyville	44	—10	18.8	2.20	22.0
Lake Konomoc	.....	.....	.....	2.56	.....
New London	43	— 3	22.8	2.81	23.0
North Grosvenor Dale	48	—20	15.8	2.79	.....
Norwalk	45	—15	19.2	3.40	24.5
Southington	45	—12	18.2	2.10	18.0
South Manchester	.....	.....	.....	2.28	23.0
Storrs	46	— 8	19.0	0.37	.....
Voluntown	44	—17	19.2	2.18	15.0
Wallingford	45[e]	— 7[e]	19.0[e]	.....	19.5
Waterbury	46	— 7	20.4	2.52	23.0
West Cornwall	40	—10	15.4	3.12	30.0
West Simsbury	.....	.....	.....	2.45	25.5
Delaware.					
Delaware City	.....	.....	.....	2.95	22.9
Dover	53	8	29.5	0.95	5.0
Milford	57	— 5	30.8	2.45	8.5
Millsboro	56	7	31.0	2.15	6.0
Newark	47	— 4	25.0	3.19	18.0
Seaford	54	5	29.4	2.60	8.0
District of Columbia.					
West Washington	56	— 2	28.4	2.48	13.9
Florida.					
Apalachicola	74	37	59.1	1.30	
Archer	89	28	59.0	0.93	
Avon Park	86	38	62.9	0.30	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Florida—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bonifay	78	28	56.9	4.78	
Brooksville	90	37[f]	62.1[d]	0.89	
Carrabelle	85	36	61.0	0.30	
Clermont	86	39	63.6	0.62	
De Funiak	79	31	56.8	3.24	
Eustis	85	34	60.6	1.93	
Federal Point	84	30	59.5	1.07	
Fenholloway	83	27	57.4	1.78	
Fernandina	82	36	57.9	0.80	
Flamingo	85	46	69.3	0.09	
Fort Meade	86	31	60.2	0.46	
Fort Myers	83	43	62.8	0.68	
Fort Pierce	85	40	63.4	0.22	
Gainesville	86	31	58.9	0.87	
Grasmere	81	38	60.2	.....	
Huntington	86	34	59.2	2.63	
Hypoluxo	87	44	66.2	2.60	
Inverness	84	33	58.9	2.48	
Jasper	81	28	57.8	0.90	
Kissimmee	85	33	61.4	0.05	
Lake City	85	30	58.8	1.06	
Macclenny	84	26	56.8	1.13	
Malabar	84	40[e]	61.8[e]	0.32	
Manatee	83	36	61.4	1.40	
Marianna	82	26	58.7	3.30	
Merritts Island	80	44	63.3	0.24	
Miami	83	48	66.6	0.16	
Middleburg	84	28	56.4	0.70	
Molino	81	25	54.7	4.10	
Monticello	79	30	57.0	1.48	
Mount Pleasant	84	26	57.8	4.69	
New Smyrna	85	36	60.6	1.70	
Ocala	86	34	60.6	2.55	
Orange City	90	31	60.2	1.94	
Orlando	85	35	61.6	0.10	
Otter Creek	86	27	58.5	1.45	
Plant City	90	32	61.0	0.70	
Rockwell	84[d]	32[d]	58.8[d]	2.65	
St. Andrew	77	29	56.7	2.54	
St. Augustine	82	32	59.0	0.67	
St. Leo	87	34	61.8	1.09	
Switzerland	84	31	57.8	0.23	
Tallahassee	77	32	57.0	2.60	
Tarpon Springs	84	34	59.6	1.59	
Wausau	82	29	57.8	2.65	
Georgia.					
Abbeville	.....	.....	.....	2.37	
Adairsville	68	22	42.4	3.80	
Albany	79	29	54.4	3.54	
Americus	78	26	50.1	2.07	
Athens	66	24	43.3	5.36	0.1
Bainbridge	80	24	54.8	3.39	
Blakely	81	22	54.6	2.67	
Butler	.....	.....	.....	2.28	
Camak	73	21	48.0	3.84	
Canton	.....	.....	.....	5.87	2.0
Carlton	.....	.....	.....	4.41	
Carrollton	70	22	44.0	5.15	
Clayton	70	20	42.7	4.50	
Cordele	77	27	52.8	2.89	
Covington	.....	.....	.....	5.33	
Cuthbert	79	26	54.0	2.20	
Dahlonega	72	20	44.3	4.79	1.2
Dawson	79	28	53.8	1.90	
Diamond	67	19	42.8	5.89	1.0
Dublin	.....	.....	.....	3.48	
Dudley	75	25	52.0	2.89	
Eastman	76	28	51.4	3.46	
Eatonton	72	23	47.6	3.92	
Elberton	68	23	46.1	4.75	
Experiment	70	24	47.6	4.21	
Fitzgerald	77	27	53.3	3.37	
Fleming	81	26	53.1	1.80	
Fort Gaines	75	29	52.0	2.99	
Gainesville	63	21	41.4	4.15	1.6
Gillsville	70	20	45.0	4.95	1.0
Glenville	76	28	51.8	1.56	
Greenbush	70	21	42.4	3.62	0.5
Greensboro	74	24	48.9	4.42	
Griffin	73	23	46.9	4.44	
Harrison	73	23	49.0	3.24	
Hawkinsville	76	28	49.3	1.80	
Helena	72	28	51.7	.....	
Lisbon	71	18	44.9	4.18	
Lost Mountain	72	20	44.4	5.36	1.9
Louisville	73	26	49.2	3.88	
Lumpkin	76	23	51.3	2.95	
Marshallville	75	24	50.8	2.03	
Mauzy	80	25	56.0	1.89	
Milledgeville	71	22	47.0	3.81	
Montezuma	.....	.....	.....	2.48	
Monticello	71	25	46.8	4.57	
Morgan	78	29	53.8	2.95	
Newnan	72	22	45.3	5.43	
Oakdale	.....	.....	.....	6.03	1.3
Point Peter	68	22	44.9	5.70	
Putnam	75	26	51.0	2.86	
Quitman	81	28	55.3	1.35	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Georgia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Ramsey	69	22	45.1	5.83	T.
Resaca	.....	.....	.....	4.52	
Rome	72	22	42.8	5.35	2.5
St. George	81	28	57.8	0.45	
St. Marys	79	28	56.4	0.83	
Screven	81	28	55.1	1.53	
Statesboro	78	27	51.4	1.55	
Talbotton	73	24	50.0	3.78	
Tallapoosa	61	21	39.8	7.73	0.5
Toccoa	67	18	42.1	3.96	0.8
Valdosta	79	27	55.2	0.12	
Valona	78	26	52.3	0.47	
Washington	69	23	45.2	4.43	
Waycross	78	29	55.6	1.33	
Waynesboro	72	25	48.1	3.34	
Westpoint	73	24	47.4	3.13	
Woodbury	70	24	46.4	3.30	
Idaho.					
Albion	63	21	40.0	.....	.....
American Falls	57	29	38.2	1.16	.....
Blackfoot	53	17	36.6	0.85	6.0
Buhl	62	24	41.4	1.61	4.5
Burke	63	3	33.6	.....	18.2
Caldwell	62	25	43.2	1.43	5.0
Cambridge	59	16	37.8	2.42	7.3
Chesterfield	51	5	30.3	0.74	9.1
Dent	53	18	36.2	2.72	14.5
Dewey	55	14	35.7	.....	.....
Ellerslie	60	23	41.6	1.79	3.0
Emmett	61	23	42.6	1.68	3.0
Forney	60	−9	30.0	2.41	23.0
Garnet	65	29	45.4	2.17	.....
Grace	52	11	33.4	2.19	9.0
Hot Springs	65	26	44.8	1.95	12.0
Idaho Falls	54	12	35.6	0.70	3.0
Kellogg	53	6	34.4	3.30	4.7
Lake	40	−4	23.7	0.90	9.0
Lakeview	52	10	38.6	3.05	9.0
Landore	54	9	33.2	4.89	22.9
Lardo	52	0	29.0	3.66	21.5
Lost River	47	0	26.2	0.23	2.0
Lowell	50	0	31.7	1.76	7.0
Meadows	51	9	33.2	1.20	9.0
Milner	56	23	39.0	3.22	9.0
Moscow	53	12	33.9	2.62	11.6
Mountain Home	60	21	40.6	2.61	5.0
Murray	52	2	31.0	3.78	9.0
Murtaugh	58	21	39.8	3.16	7.0
Nevens Ranch	.....	.....	.....	5.40	.....
Oakley	59	22	41.0	1.59	2.0
Orofino	55	17	36.0	2.61	16.5
Paris	49	4	28.4	.....	.....
Payette	63	24	41.8	1.39	3.1
Pollock	63	25	42.0	.....	.....
Poplars	.....	.....	.....	1.23	4.0
Porthill	50	−3	29.3	2.48	14.0
Rupert	57	22	39.4	2.29	7.0
St. Maries	56	8	35.7	2.14	8.0
Salem	.....	.....	.....	0.69	1.9
Salmon	50	5	27.6	0.65	10.1
Standrod	.....	.....	.....	1.66	6.7
Twin Falls	60	23	40.2	2.90	.....
Vernon	52	6	30.5	0.75	.....
Weston	59	17	37.1	1.69	4.0
Illinois.					
Albion	67	6	34.3	0.71	6.2
Aledo	60	−8	27.6	0.26	3.8
Alexander	65	−8	30.7	0.26	3.8
Antioch	52	−14	22.8	0.30	3.0
Ashton	54	−14	24.6	0.61	7.2
Astoria	61	−12	29.3	0.36	3.5
Aurora	53	−14	24.7	0.26	2.6
Beardstown	.....	.....	.....	0.24	2.0
Benton	68	6	38.0	0.45	6.0
Bloomington	61	−2	29.9	0.07	1.0
Bushnell	62	−7	29.2	0.00	0.0
Cambridge	59	−6	27.8	0.60	6.0
Carlinville	69	−11	32.2	0.57	6.0
Carlyle	.....	.....	.....	0.94	6.0
Carrollton	71	−4	32.4	0.90	7.0
Charleston	62	−4	31.2	0.34	2.8
Chester	72	4	37.4	1.30	9.0
Cisne	69	3	35.4	0.30	4.0
Coatsburg	56[c]	−9[c]	26.2[c]	T.	T.
Cobden	71	5	36.6	1.56	4.0
Colchester	64	−7	30.2	0.11	1.5
Decatur	64	−4	29.0	0.30	3.0
Dixon	55	−17	25.4	0.22	1.0
Dwight	56	−8	27.0	0.14	2.4
Elgin	54	−12	25.0	0.72	1.7
Equality	72	5	37.9	1.35	8.0
Flora	62[c]	1[c]	33.4[c]	0.63	3.9
Friendgrove	64	8	33.8	0.60	3.4
Galva	58	−7	26.0	0.20	4.5
Grafton	.....	.....	.....	1.42	9.0
Greenville	65	−2	32.4	0.75	6.5
Griggsville	65	−6	31.5	0.49	.....
Halfway	69	4	36.2	1.10	5.0

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Illinois—Cont'd.	°	°	°	*Ins.*	*Ins.*
Havana	60	−3	31.2	0.22	2.2
Henry	58	−11	28.5	0.16	2.0
Hillsboro	68	−3	33.0	0.55	5.0
Hoopeston	56	−5	28.2	0.22	2.1
Joliet	52	−6	26.0	0.32	3.3
Kishwaukee	55	−16	24.3	0.29	5.0
Knoxville	56	−10	28.3	0.07	0.8
Lagrange	52	−12	24.0	0.40	6.5
Laharpe	63	−13	28.4	0.30	2.0
Lanark	55	−20	23.7	0.22	2.2
Lincoln	66	−2	30.8	0.24	2.4
Loami	.....	.....	.....	0.19	1.8
McLeansboro	67	7	35.2	0.91	6.6
Martinsville	63	0	32.0	0.09	0.9
Martinton	55	−7	25.8	0.20	2.0
Minonk	59	−7	28.2	0.06	0.5
Monmouth	62	−9	28.5	0.27	4.5
Morrison	54	−15	25.7	0.46	5.0
Morrisonville	63	−10	31.1	0.19	1.0
Mount Carmel	.....	.....	.....	1.28	7.2
Mount Vernon	70	4	34.0	1.00	7.0
New Burnside	69	1	36.5	2.11	8.8
Olney	66	3	33.9	0.52	3.2
Ottawa	54	−7	27.8	0.15	1.5
Palestine	63	3	33.0	0.10	1.0
Pana	65	−2	31.6	0.66	3.0
Paris	69	−1	29.4	0.07	.....
Philo	58	−4	29.2	0.16	1.0
Pontiac	57	−5	29.2	0.15	1.5
Rantoul	60	−5	29.4	0.08	2.0
Raum	70	4	36.4	2.05	6.5
Riley	50	−12	22.8	0.38	4.1
Robinson	63	2	32.9	2.67	0.8
Rockford	50[c]	−9[c]	23.6[d]	0.69	.....
Rushville	62	−7	30.6	0.25	2.5
St. Charles	52	−15	24.8	0.70	7.0
St. John	62	3	36.0	0.82	4.0
Streator	56	−6	26.8	0.10	1.0
Sullivan	66	−4	31.2	0.40	2.0
Sycamore	55	−13	23.2	0.30	3.0
Tilden	69	0	35.6	1.16	5.7
Tiskilwa	57	−7	27.4	0.33	4.2
Urbana	58	−3	28.9	0.24	2.5
Vernon	66	−3	34.0	0.88	6.5
Walnut	54	−7	27.4	0.25	5.1
Warsaw	.....	.....	.....	T.	T.
Windsor	62	−7	30.7	0.48	3.1
Winnebago	54	−13	23.0	0.76	8.0
Yorkville	51	−14	24.1	0.17	1.9
Zion	55	−16	22.8	0.34	3.4
Indiana.					
Anderson	59	3	28.7	0.15	0.1
Angola	50	−3	23.6	0.28	1.3
Auburn	54[c]	−5[c]	22.2[c]	0.19	.....
Bedford	66	8	33.8	0.50	2.0
Bloomington	64	9	35.4	0.74	4.0
Bluffton	59	−3	26.6	0.20	T.
Butlerville	62	1	31.2	0.98	4.5
Cambridge City	61	−1	26.2	0.48	.....
Columbus	70	3	31.2	0.24	1.2
Connersville	64	3	30.6	0.11	0.5
Crawfordsville	63	2	29.5	.....	.....
Delphi	58	0	26.4	0.32	3.2
Elkhart	56	−2	24.7	0.25	2.7
Eminence	63	1	31.3	0.31	1.2
Farmland	54	0	28.2	0.39	1.2
Fort Wayne	57	0	26.0	0.08	0.7
Franklin	66	3	31.1	0.25	0.5
Greenfield	60	3	30.2	T.	T.
Greensburg	62	3	31.2	0.45	1.5
Holland	69	0	36.0	1.49	4.5
Huntington	55	2	26.8	0.16	1.6
Jeffersonville	66	7	35.2	1.18	7.0
Knox	53	−2	25.6	0.23	3.8
Kokomo	59	0	28.4	0.04	1.0
Lafayette	59	2	27.3	0.41	4.9
Laporte	50	−2	24.6	1.00	5.2
Lima	53	−5	22.4	0.22	1.5
Logansport	61	0	27.2	0.35	3.5
Madison	65	4	33.2	0.71	3.5
Marengo	65	−6	32.3	1.99	8.7
Marion	58	2	27.6	0.15	1.5
Markle	57	1	26.4	0.10	0.5
Mauzy	61	1	28.6	0.35	1.8
Moores Hill	62	1	30.2	0.85	3.0
Mount Vernon	69	6	34.6	1.63	10.5
Northfield	60	1	27.2	0.30	1.0
Paoli	65	4	31.6	0.93	6.0
Plymouth	55	−3	24.8	0.06	0.6
Princeton	67	6	34.6	2.25	10.0
Rensselaer	56	−5	27.5	0.08	2.5
Richmond	61	−2	28.4	0.16	0.3
Rochester	50	−1	26.5	0.15	1.5
Rockville	58	3	30.4	0.15	T.
Rome	70	6	36.6	0.98	8.3
Salamonia	57	−11	26.6	0.16	0.7
Salem	66	−5	31.9	0.48	4.5
Scottsburg	64	−1	34.5	0.66	3.2

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Indiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Shelbyville	60	5	29.8	0.25	0.2
South Bend	53	— 3	24.4	0.42	5.5
Syracuse	56	— 4[g]	23.8[g]	T.	T.
Terre Haute	61	6	33.0	0.55	1.7
Veedersburg	60	0	30.4	T.	
Vincennes	65	7	32.0	0.20	4.0
Washington	65	7	33.0	1.74	1.5
Worthington	63	4	32.8	0.52	1.7
Indian Territory					
Ada	81	14	46.8	0.54	T.
Ardmore	82	16	48.3	0.65	
Calvin				0.36	
Chickasha	81	11	46.9	0.40	T.
Durant	80	18	47.0	1.12	
Fairland	75	8	41.1	0.05	0.5
Fort Gibson				0.17	
Hartshorn	80	15	47.4	2.17	
Healdton	80	14	46.7	1.25	
Marlow	80	11	45.2	T.	
Muskogee	77	12	43.6	0.14	
Okmulgee	80	13	43.2	0.30	
Pauls Valley	86	12	45.4	0.55	
Ravia	81	17	48.6	0.76	0.2
South McAlester	81	15	48.8	0.48	
Tulsa	80	10	41.5	0.20	
Unita	75	9	41.1	1.13	1.0
Wagoner	78	11	41.0	0.30	
Webbers Falls				0.65	
Iowa.					
Afton	54	—15	27.6	0.78	6.0
Albia	58	—13	27.3	0.11	1.0
Algona	52	—25	22.0	0.99	6.5
Allerton	58	—13	28.8	0.51	2.5
Alta	58	—20	22.8	0.92	3.3
Alton	57	—22	24.2	0.55	5.5
Amana	52	—16	26.2	0.32	2.5
Ames	55	—21	25.7	0.55	3.2
Atlantic	59	—20	27.1	0.98	3.0
Audubon	57	—24	25.4	0.96	4.0
Baxter	57	—18	25.7	0.40	3.0
Bedford	59	—13	27.4	1.02	8.1
Belleplaine	55	—18	23.7	0.97	5.0
Bloomfield	58	—11	29.2	0.16	2.0
Bonaparte	59	—11	28.6	0.10	1.0
Boone	56	—18	24.4	0.69	3.0
Britt	50	—25	21.6	1.48	2.7
Buckingham				0.79	1.5
Burlington	64	— 8	28.0	0.26	3.0
Carroll	57	—20	23.8	1.10	6.5
Cedar Rapids	54	—15	23.4	0.41	4.1
Chariton	58	—16	27.4	0.25	2.0
Clarinda	61	—12	26.7	0.66	6.2
Clearlake	49	—20	21.9	0.75	2.5
Clinton	55	—10	26.2	0.81	8.0
College Springs	57	—12	27.6	1.32	6.0
Columbus Junction	58	— 8	28.4	0.23	2.7
Corning	58	—15	26.6	1.08	7.0
Corydon	59	—15	29.0	0.23	1.0
Creston	57	—15	26.0	0.45	3.5
Cumberland				1.11	6.0
Decorah	46	—23	20.6	0.49	4.5
Delaware	47	—13	21.0	0.34	4.5
Desoto	57	—23	26.0	0.59	3.0
Dows	52	—22	22.4	0.69	2.8
Earlham	57	—19	24.6	0.73	6.5
Elkader	54	—25	22.6	0.62	7.0
Elliott	55	—18	26.6	1.25	6.5
Estherville	57	—25	19.8	0.70	5.0
Fayette	48	—23	21.0	0.71	7.1
Forest City	53	—21	20.0	1.30	3.0
Fort Dodge	57	—21	23.7	0.57	1.0
Fort Madison				0.20	2.0
Galva	56	—24	24.6	0.90	2.8
Gilman				0.30	3.0
Grand Meadow	46	—17	20.6	0.84	5.5
Grinnell (near)	56	—19	25.5	0.73	5.5
Grundy Center	52	—20	24.4	0.85	2.5
Guthrie Center	55	—22	25.6	0.91	5.5
Hampton	54	—20	23.1	1.69	6.8
Hancock	56	—15	26.8	0.93	4.5
Harlan	60	—19	26.2	1.10	4.4
Hopeville	57	—15	27.9	0.52	2.3
Humbolt	54[e]	—14[e]	25.8[e]	0.80	1.5
Independence	48	—20	22.2	0.64	6.0
Indianola	58	—12	28.0	0.77	3.8
Inwood	59	—25	22.6	0.60	6.9
Iowa City	56	—16	24.8	0.22	3.0
Iowa Falls	51	—21	21.8	0.79	6.5
Jefferson	58	—21	26.4	0.36	3.5
Keosauqua	59	—10	25.2	0.15	1.5
Knoxville	57	—14	28.3	0.45	3.5
Lacona				0.84	
Larrabee	56	—22	23.6	0.78	6.6
Leclaire				0.41	5.5
Lemars	56	—24	24.0	0.92	10.0
Lenox	55	—16	27.0	0.83	4.7
Leon	64	—13	28.5	0.99	3.7
Little Sioux	61	—22	26.4	1.19	5.2
Iowa—Cont'd.					
Logan	60	—17	26.6	1.63	9.0
Maple Valley				0.45	2.3
Marshalltown	55	—18	23.2	0.55	6.2
Mason City	50	—18	22.4	0.85	4.5
Massena	59	—17	27.2	0.73	4.4
Mountayr	59	—13	28.6	1.22	8.8
Mount Pleasant	59	— 9	29.0	0.21	2.8
Mount Vernon	58	—14	25.6	0.45	6.7
Muscatine				0.26	4.5
Nevada				0.93	4.2
New Hampton	45	—18	20.2	0.34	4.0
Northwood	47	—22	20.4	0.46	4.6
Odebolt	59	—19	26.2	0.95	4.0
Ogden	55	—19	26.0	0.35	3.5
Onawa	61	—16	27.6	0.90	5.5
Osage	48	—20	21.4	0.78	5.3
Oskaloosa	55	—14	28.0	0.32	2.5
Ottumwa	59	— 9	29.0	0.65	1.5
Pella	55	—14	28.6	0.24	2.8
Perry	57	—23	25.8	0.81	4.5
Plover	55	—26	23.3	0.33	1.0
Pocahontas	55	—24	23.8	1.16	5.2
Ridgeway	54	—18	22.3	0.85	5.1
Rockwell	55	—21	25.2	1.95	9.5
Sac City				1.05	3.5
St. Charles	65	—16	29.8	0.55	4.5
Sheldon	60	—23	23.1	1.15	11.0
Sibley	58	—23	19.5	0.57	5.7
Sigourney	54	—11	27.6	0.50	3.5
Sioux Center	55	—21	22.6	0.85	8.5
Stockport	57	—13	28.4	0.06	2.5
Storm Lake	54	—27	23.2	0.65	2.1
Stuart	53	—18	24.6	1.52	6.0
Thurman	61	—17	26.5	1.95	12.0
Tipton	53	— 4	27.0	0.17	1.7
Toledo	52	—17	25.1	0.51	4.3
Washington	59	—10	27.4	0.23	
Washta	60	—31	24.0	0.75	3.5
Waterloo	54	—18	24.1	0.57	4.0
Waukee	53	—22	26.5	0.97	8.0
Waverly	49	—18	22.8	0.57	4.8
Webster City	53	—22	24.8	1.06	6.0
Westbend	53	—24	22.1	0.97	3.2
Whitten	52	—20	23.2	0.30	3.0
Wilton Junction	54	—13	26.1	0.29	0.2
Winterset	54	—16	27.2	0.55	3.0
Woodburn	58	—18	28.0	0.40	4.0
Kansas.					
Abilene				1.46	3.0
Alton	78	— 3	32.0	0.73	1.0
Anthony	80	4	41.8	0.75	T.
Atchison	62	— 8	31.4	0.91	7.3
Baker	67	—11	29.2	2.05	4.5
Beloit				0.54	1.5
Blue Rapids				0.56	1.5
Burlington	71	0	36.2	0.84	0.5
Chapman	70	— 4	33.7	1.25	2.0
Cimarron	77	— 3	38.0	0.19	T.
Clay Center	67	— 4	31.4	1.45	2.5
Colby	74	— 5	35.6	0.09	0.9
Coldwater	82	— 1	41.2	0.34	T.
Columbus	71	4	38.0	0.79	1.2
Coolidge	79	4	38.4	T.	
Cottonwood Falls	72	— 7	34.0	2.04	2.4
Cunningham	77	— 1	39.7	0.64	0.4
Dresden	75	— 6	36.2	0.14	1.0
Eldorado	72	1	36.0	2.03	1.5
Ellinwood	75	— 3	36.4	0.82	3.5
Ellsworth	76	— 4	34.8	0.81	2.0
Emporia	65	— 4	34.4	1.91	6.0
Englewood	78	2	40.6	T.	T.
Enterprise	70	— 4	32.9	1.38	2.0
Eskridge	62	— 5	32.8	1.48	4.0
Eureka				1.36	1.0
Fall River	76	3	37.4	1.29	0.5
Farnsworth	79	— 3	37.3	0.16	T.
Fort Scott	71	0	37.3	0.81	1.0
Frankfort	68	— 9	31.4	1.80	8.5
Garden City	78	— 1	38.0	0.23	1.6
Garnett	69	— 2	35.1	0.73	2.0
Goodland				T.	T.
Gove[h,i]	76	0	36.3	0.20	1.0
Grenola	72	3	37.4	0.84	T.
Hanover	66	— 8	30.6	1.69	4.9
Harrison	67	— 6	31.4	0.81	2.0
Hays	77	— 3	35.3	0.22	0.8
Hill City	76	— 3	35.2	0.08	T.
Horton	63	— 9	30.6	1.66	5.5
Hutchinson	72	— 5	36.0	1.07	3.0
Independence	70	7	39.0	0.50	0.4
Jetmore				0.28	0.5
Jewell	70	— 4	31.5	0.87	3.5
La Crosse	76	— 7	35.8	0.29	1.5
Lakin	74	1	38.4	T.	T.
Larned	77	— 6	35.5	0.14	T.
Lebanon	69	— 6	33.4	0.43	3.5
Lebo	67	— 6	33.6	1.66	2.2
Lindsborg				0.52	2.1
Kansas—Cont'd.					
McPherson	70	— 3	34.2	1.34	1.5
Macksville	80	— 3	37.2	0.49	0.9
Madison	70	— 7	33.0	1.99	T.
Manhattan	66	— 3	31.9	0.90	4.0
Manhattan Agr. College	66	— 4	31.6	1.61	4.0
Minneapolis	67	— 3	32.8	0.79	2.5
Moran	70	1	36.1	0.02	0.2
Mounthope				1.05	4.0
Neosho Rapids				0.98	0.2
Ness City	76	— 3	37.3	0.30	T.
Newton	70	— 4	34.7	1.18	1.2
Norton	76	— 6	34.3	T.	T.
Norwich	72	0	38.8	1.17	0.8
Oberlin				0.35	3.0
Olathe	66	— 8	32.6	0.71	6.5
Osage City	68[d]	— 6[e]	32.1[e]	2.02	4.8
Oswego	72	4	39.2	0.36	0.5
Ottawa	69	— 8	33.8	1.00	5.5
Paola	70	— 6	34.0	2.20	
Phillipsburg	75	— 5	34.3	0.25	2.5
Plainville	69	— 5	32.8	0.27	0.2
Pleasanton	67	— 5	35.6	0.60	3.0
Pratt	76[e]	— 2	36.4[e]	0.82	2.5
Republic	64	— 6	32.2	0.93	3.0
Rome	74	4	38.4	1.06	T.
Russell	75	— 3[d]	35.2[b]	0.20	T.
Salina	70	— 2	32.7	0.96	1.0
Scott	78	— 2	39.0	0.50	0.2
Sedan	72	— 6	38.9	0.30	T.
Toronto	72	— 1	35.4	0.90	0.5
Ulysses	79	2	39.1	0.25	0.5
Valley Falls	65	— 9	31.6	0.97	5.1
Wakeeney	77	— 5	37.8	0.35	1.5
Wakeeney (near)				0.58	1.0
Wallace	76	— 2	36.9	T.	0.2
Walnut	69	3	37.8	0.28	T.
Winfield	71	4	38.0	1.00	0.5
Yates Center	73	1	37.2	1.08	1.0
Kentucky.					
Alpha	67	10	40.5	4.10	7.0
Anchorage	69	0	33.2	0.75	6.1
Bardstown	69	2	35.2	3.18	8.5
Beattyville	70	2	33.9	4.00	18.0
Beaver Dam	70	— 2	36.4	2.93	8.0
Berea	69	9	36.2	3.59	13.9
Blandville	66	5	37.7	4.44	3.5
Bowling Green	72	1	38.2	2.91	15.4
Burnside	73	10	38.1	4.39	7.0
Cadiz	73	— 5	36.9	4.83	7.0
Calhoun	71	7	38.1	1.75	6.7
Catlettsburg				2.64	5.0
Earlington	72	1	36.2	3.12	9.5
Edmonton	70	— 4	37.8	5.17	14.8
Eubanks	68	7	34.2	4.48	15.6
Falmouth				1.56	5.0
Farmers	67	— 4	33.8	2.82	6.0
Frankfort	65	— 1	34.6	1.86	7.5
Franklin	72	1	39.2	4.69	6.8
Greensburg	70	— 6	33.6	4.45	11.5
High Bridge				2.00	2.0
Hopkinsville	71	—10	37.8	5.95	8.0
Irvington	68	8	36.4	1.54	4.5
Jackson	69	11	38.1	3.33	12.0
Leitchfield	68	5	35.6	2.46	9.0
Loretto				2.95	11.2
Lynnville	71	3	39.5	6.06	7.5
Manchester	67	11	35.5	4.12	9.0
Marion	69	6	37.4	2.13	6.0
Maysville	67	— 1	30.6	1.82	6.0
Middlesboro	65	7	38.2	4.67	
Mount Sterling	63	10	33.4	3.24	7.0
Owensboro	72	10	36.6	2.28	9.7
Owenton	60	5	33.5	0.86	6.5
Paducah	70	11	39.2	3.86	2.3
Princeton	71	8	39.2	5.84	2.0
Richmond	68	4	35.2	3.22	
St. John	68	2	33.6	2.69	7.0
Scott	63	3	30.4	0.66	2.7
Shelby City	68	0	34.2	3.16	15.5
Shelbyville	68	— 4	32.2	1.70	14.0
Taylorsville	66	— 4	34.0	1.68	6.3
Williamsburg	68	12	36.4	2.75	6.0
Williamstown	65	2	30.4	1.14	3.8
Louisiana.					
Abbeville	82	30	57.6	2.53	
Alexandria	85	29	55.8	5.18	
Amite	79	27	55.2	7.10	
Baton Rouge	82	31	55.2	1.97	
Burnside	80	29	56.9	5.46	
Calhoun	78	26	52.9	1.92	
Cameron	74	32	58.6	2.20	
Cheneyville	85	29	54.6	6.48	
Clinton	83	28	55.6	2.09	
Collinston	80[d]	27[e]	53.3[d]	2.50	
Covington	79	30	55.9	3.54	
Crowley	81	32	57.3	2.56	
Donaldsonville	86	32	59.2	8.47	
Farmerville	81	28	53.0	4.76	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Louisiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Franklin	82	31	58.4	2.59	
Grand Coteau	83	31	57.2	5.14	
Houma	79	31	57.0	5.28	
Jennings	82	30	57.1	2.81	
Lafayette	82	28	56.7	2.59	
Lake Charles	82	31	57.7	2.80	
Lakeside	86	32	58.5	2.88	
Lawrence	80	35	58.0	5.98	
Libertyhill	81	27	53.8	3.19	T.
Logansport	.....	.....	.....	3.60	
Melville	80	29	53.8	3.50	
Minden	80	29	50.7	1.07	
Monroe	.....	.....	.....	3.62	
New Iberia	81	35	59.2	2.70	
Opelousas	84	21	53.2	2.95	
Pearl River	.....	.....	.....	4.76	
Plain Dealing	80	26	51.0	2.37	
Rayne	84	29	56.0	2.84	
Reserve	.....	.....	.....	4.30	
Robeline	86	21	53.0	2.45	
Ruston	80	25	53.7	2.80	
St. Francisville	82	32	55.9	4.00	
Schriever	83	30	58.0	3.98	
Simmesport	.....	.....	.....	4.06	
Southern University	.....	.....	.....	5.62	
Sugar Experiment Station	78	35	58.0	4.82	
Sugartown	86	33	55.7	5.07	
Maine.					
Bar Harbor	45	—10	17.0	3.45	30.5
Cornish	47	—12	15.0	2.45	24.0
Danforth	.....	.....	.....	5.12	49.0
Debsconeag	40	—30	11.3	1.75	17.5
Fairfield	41	—29	12.4	2.65	25.5
Farmington	41	—21	12.2	1.96	26.5
Gardiner	55	—24	16.2	2.50	34.2
Greenville	37	—28	6.8	1.30	13.0
Lewiston	45	—13	13.6	2.29	29.2
Madison	42	—24	10.2	2.45	36.5
Mayfield	39	—14	13.4	1.72	19.0
Millinocket	42	—26	9.2	1.95	26.2
North Bridgton	47	—20	14.2	1.89	24.0
Oquassoc	44	—24	8.9	1.38	23.5
Orono	43	—28	13.8	3.01	27.0
Patten	38	—24	8.4	2.40	24.0
Rumford Falls	40	—14	11.4	1.52	17.0
The Forks	.....	.....	.....	2.15	26.4
Van Buren	36	—37	3.4	1.80	20.0
Winslow	42	—29	13.6	1.56	20.0
Maryland.					
Annapolis	50	6	29.5	3.55	20.0
Bachmans Valley	47	—13	23.2	2.39	19.5
Cambridge	54	3	30.1	2.65	9.6
Cheltenham	56	0	28.7	2.04	13.5
Chestertown	50	3	27.8	1.80	13.5
Chewsville	46	—17	24.4	1.71	15.5
Clearspring	50	— 5	22.8	2.99	19.9
Coleman	49	5	28.2	1.59	12.0
Cumberland	50	— 8	26.5	2.10	20.0
Darlington	47	— 1	24.8	2.39	19.5
Deerpark	56	—24	23.6	3.13	26.0
Denton	53	— 3	28.6	2.48	8.0
Easton	53	5	29.1	2.24	10.5
Fallston	51	— 1	25.6	2.16	15.8
Frederick	53	— 8	26.6	2.33	17.0
Frostburg	.....	.....	.....	2.50	23.0
Grantsville	52	—16	25.0	3.04	26.0
Great Falls	54	— 6	28.4	2.50	13.7
Greenspring Furnace	50	— 9	26.6	2.25	17.3
Harney	.....	.....	.....	2.10	18.3
Jewell	54	3	29.3	2.23	16.0
Keedysville	51	—16	26.4	2.70	19.5
Lake Montebello	54	— 5	26.9	2.10	15.8
Laurel	55	0	27.0	2.43	19.0
Monrovia	55	— 4	26.6	2.10	14.3
Mount St. Marys College	49	6	28.7	2.25	20.1
Oakland	53	—29	24.4	2.23	18.0
Ocean City	55	11	31.0	.....	.....
Pocomoke City	59	10	33.0	2.80	6.0
Porto Bello	58	10	32.7	1.87	.....
Princess Anne	58	9	31.4	3.45	8.1
Salisbury	59	8	31.6	3.19	10.2
Solomons	57	11	30.8	2.33	6.7
Sudlersville	50	— 5	27.4	2.50	11.8
Takoma Park	55	2	26.6	2.04	15.3
Taneytown	48	—21	22.8	2.71	22.3
Van Bibber	48	3	26.6	.....	.....
Westernport	55	—11	27.9	2.17	20.8
Woodstock	51	— 6	28.6	2.13	15.2
Massachusetts.					
Amherst	43	—18	16.0	1.92	18.5
Bedford	47	—13	18.2	1.56	19.0
Bluehill (summit)	46	— 8	18.4	3.23	31.8
Chestnuthill	51	—10	21.6	3.31	27.8
Concord	48	—19	16.2	1.40	13.8
Fallriver	45	— 3	21.7	3.09	28.8
Fitchburg	48	— 9	18.0	1.64	18.5
Framingham	48	—19	18.7	2.37	19.0
Massachusetts—Cont'd.	°	°	°	*Ins.*	*Ins.*
Groton	47	—14	16.9	1.96	21.5
Hyannis	40	— 1	23.9	2.54	16.7
Jefferson	.....	.....	.....	2.37	25.0
Lawrence	49	—18	17.1	1.77	23.8
Leominster	.....	.....	.....	1.81	17.5
Lowell	48	—13	19.3	2.39	.....
Middleboro	46	—20	19.8	3.83	27.2
Monson	46	—19	17.0	2.11	18.0
New Bedford	46	— 2	22.6	.....	.....
Pittsfield	.....	.....	.....	1.72	21.0
Plymouth	42	— 4	22.0	3.41	16.5
Princeton	.....	.....	.....	1.86	16.5
Provincetown	42	2	26.0	2.29	20.0
Salem	.....	.....	.....	2.18	24.0
Somerset	45	—14	20.9	3.81	37.8
Sterling	.....	.....	.....	2.79	18.8
Taunton	45	—20	18.3	3.12	.....
Webster	.....	.....	.....	1.88	21.8
Westboro	46	—16	19.6	2.59	21.5
Weston	48	—18	17.5	2.13	21.3
Williamstown	43	—11	15.2	1.52	15.5
Worcester	49	— 6	19.1	1.61	21.1
Michigan.					
Adrian	52	— 7	22.8	0.20	2.0
Agricultural College	46	—10	19.2	0.25	2.5
Allegan	57[a]	—10[a]	22.6[a]	0.30	3.0
Alma	46	—12	17.9	0.30	3.5
Ann Arbor	48	— 9	19.2	1.22	3.8
Arbela	43	— 8	18.6	0.33	2.5
Ball Mountain	42	—13	16.8	0.49	4.9
Baraga	42	—31	13.6	0.20	2.0
Battlecreek	49	— 9	22.0	0.36	4.0
Bay City	43	— 7	17.5	1.05	7.0
Benzonia	43	— 1	20.2	.....	.....
Berlin	42	—10	17.2	0.40	4.0
Big Rapids	46	—16	19.2	1.23	4.0
Birchwood	56	— 5	27.2	0.65	6.5
Blaney	39	—19	13.5	0.95	9.5
Bloomingdale	54	—11	22.0	0.23	6.7
Calumet	41	—16	12.0	0.80	10.0
Cassopolis	52	—10	23.0	0.30	4.0
Charlevoix	41	—17	19.5	0.85	8.5
Charlotte	49	—14	21.0	0.30	3.0
Chatham	42	—32	11.4	1.20	11.6
Cheboygan	45	—17	14.9	0.57	3.0
Clinton	51	—15	20.5	0.15	1.5
Coldwater	62[a]	—10[a]	22.5[a]	1.17	8.0
Concord	48	—12	20.8	0.25	4.0
Deer Park	36	— 9	14.8	1.85	18.5
Dundee	54	— 9	21.7	0.75	6.0
Eagle Harbor	43	— 9	14.0	1.36	13.6
East Tawas	39	—10	16.8	0.11	1.1
Eloise	46	—12	19.6	0.34	5.6
Flint	47	— 8	20.0	0.15	1.5
Frankfort	40	1	21.7	1.10	11.0
Gaylord	48	—10	19.8	1.00	10.0
Grand Marais	30	— 7	12.2	1.75	36.5
Grape	52	— 8	22.0	0.17	2.9
Grasslake	48	—13	19.0	0.37	4.0
Grayling	48	—18	15.0	1.10	11.0
Hagar	45	—12	21.3	0.50	5.0
Harbor Beach	42[a]	— 8	14.0[a]	.....	.....
Harrison	43	—17	16.7	0.10	1.0
Harrisville	44	—12	15.4	1.92	17.2
Hayes	40	—11	15.1	0.30	3.0
Highland	.....	.....	.....	0.60	6.0
Hillsdale	50	—10	20.6	0.26	4.1
Holland	51	—13	22.0	1.10	10.0
Howell	45	—15	16.9	0.22	2.2
Humboldt	38	—41	8.3	0.85	8.5
Iron Mountain	46	—29	14.5	0.77	8.0
Iron River	45	—42	10.6	1.20	13.0
Ironwood	46	—29	14.2	1.20	12.0
Ivan	45	—16	16.4	0.97	13.5
Jackson	52	— 9	21.8	0.45	4.0
Jeddo	42	— 7	17.5	0.66	6.6
Kalamazoo	50	— 3	22.4	0.90	9.0
Lansing	49	— 8	20.3	0.36	2.7
Ludington	42[a]	0[a]	22.0[a]	0.75	7.5
Mackinaw	46	—17	13.1	1.60	16.0
Mancelona	43	—13	16.2	0.93	7.0
Maple Ridge	43	—27	12.2	1.40	14.0
Montague	40	— 2	20.0	0.74	7.0
Mount Clemens	44	—13	18.8	0.40	4.0
Mount Pleasant	.....	.....	.....	0.25	2.5
Muskegon	48	0	21.0	0.85	8.5
Newberry	.....	.....	.....	0.70	7.0
Old Mission	44	— 8	17.9	1.25	12.8
Olivet	48	— 7	20.2	0.20	1.9
Omer	43	—24	15.8	0.20	2.0
Owosso	45	—12	18.8	0.23	2.0
Petoskey	50	—13	17.2	0.64	6.5
Plymouth	47	—11	21.0	0.30	3.0
Pontiac	50	—14	18.8	0.25	2.5
Port Austin	40	— 4	18.2	0.30	3.0
Powers	44	—27	14.2	0.70	7.0
Reed City	44	—21	17.5	0.35	3.5
Saginaw (W. S.)	46	— 6	19.8	0.41	3.7
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
St. Johns	60[a]	3[a]	23.2[a]	0.44	2.7
St. Joseph	50	0	24.6	0.47	7.0
Saranac	50	—14	20.2	0.10	1.0
Slocum	43	— 9	19.5	0.30	3.0
South Haven	54	— 6	22.8	0.25	4.5
Stanton	38[a]	—16[a]	16.8[a]	0.35	3.5
Thornville	49	— 9	19.1	0.82	9.0
Traverse City	45[a]	— 8[a]	21.7[a]	1.44	15.0
Vassar	45	—14	17.8	0.95	6.0
Wasepi	52	— 7	22.6	0.29	2.0
Webberville	46	—14	18.4	0.50	5.0
West Branch	48	—15	16.1	1.00	9.0
Wetmore[d]	40	—31	14.0	.....	.....
Whitefish Point	35	—18	11.0	0.66	6.8
Woodlawn	46	—26	12.8	1.65	16.0
Ypsilanti	48	—11	19.6	0.65	5.8
Minnesota.					
Albert Lea	50	—20	20.0	0.95	5.0
Alexandria	47	—39	11.2	0.52	3.5
Angus	40[a]	—41[d]	5.4[a]	.....	.....
Bagley	51	—47	9.0	0.10	1.0
Beardsley	52	—31	17.4	0.35	3.5
Beaulieu	43	—35	10.0	T.	T.
Bird Island	53	—30	18.7	0.61	4.9
Blackduck	48	—43	9.8	0.10	.....
Caledonia	43	—19	19.7	0.23	3.0
Cass Lake	.....	.....	.....	0.08	2.2
Collegeville	48	—24	17.6	0.98	8.1
Crookston	37	—36	8.0	0.10	1.0
Detroit	42	—52	6.6	0.21	2.5
Fairmount	50	—26	19.6	0.93	8.3
Faribault	50	—33	18.8	1.02	11.0
Farmington	46	—24	17.5	0.90	8.5
Fergus Falls	46	—33	15.0	0.53	5.2
Fort Ripley	.....	.....	.....	0.40	9.0
Glencoe	53	—26	22.0	0.70	7.0
Grand Meadow	47	—22	18.8	0.74	4.5
Hallock	38	—42	5.0	0.52	5.2
Hinckley	44	—39	13.4	.....	.....
International Falls	52	—41	2.7	.....	.....
Leech Lake	45	—44	7.2	0.47	6.3
Little Falls	45	—35	13.5	0.80	8.0
Long Prairie	47	—43	13.6	0.45	6.5
Luverne	54	—25	21.0	0.31	5.0
Lynd	56	—35	18.4	0.27	4.5
Mankato	.....	.....	.....	0.59	9.5
Maple Plain	46	—30	16.6	0.99	10.6
Milaca	45	—36	9.1	0.95	9.0
Milan	53	—36	16.8	1.00	10.0
Minneapolis	48	—30	16.8	0.85	9.2
Montevideo	54	—34	18.0	0.57	4.5
Mora	47	—44	13.2	0.52	4.5
Morris	48	—32	14.8	0.50	5.0
Mount Iron	48	—44	11.2	0.80	8.0
New London	54	—34	14.0	0.54	4.0
New Richland	50	—28	20.1	0.51	5.1
Park Rapids	45	—46	9.6	0.67	6.7
Pine River	.....	.....	.....	0.21	6.5
Pipestone	52	—23	19.3	.....	.....
Pokegama Falls	49	—47	10.4	0.17	1.8
Redwing	.....	.....	.....	1.10	11.0
Redwood Falls	55	—30	21.6	0.65	6.5
Reeds	.....	.....	.....	0.53	15.0
St. Charles	48	—26	17.4	0.39	.....
St. Cloud	45	—29	16.2	0.78	6.8
St. Peter	52	—36	17.6	0.50	8.8
Sandy Lake Dam	45	—45	12.0	0.11	.....
Shakopee	45	—34	17.6	0.90	9.0
Taylors Falls	52	—38	18.2	0.84	8.5
Tonka	.....	.....	.....	0.72	.....
Two Harbors	47	—34	15.2	0.50	6.0
Wabasha	47	—28	19.2	0.76	7.5
Wadena	50	—43	12.8	0.33	7.2
Willow River	48	—52	10.8	.....	.....
Winnebago	46[a]	—26	18.9	0.99	8.3
Winnebegoshish	44	—41	10.2	0.36	3.4
Winona	45	—27	16.2	0.28	3.0
Worthington	51	—26	18.0	0.32	2.0
Zumbrota	44	—24	18.7	1.49	.....
Mississippi.					
Aberdeen	75	23	47.8	5.97	
Agricultural College	75[a]	23[a]	48.9[a]	5.91	
Austin	75	19	47.3	4.89	T.
Batesville	77	19	47.6	4.40	
Bay St. Louis	76	31	56.4	4.52	
Bellefontaine	72	21	48.2	5.10	
Biloxi	76	33	57.4	2.24	
Booneville	70	16	45.0	4.09	1.2
Brookhaven	78	28	53.0	3.67	
Canton	74	24	51.0	8.30	
Columbia	.....	.....	.....	4.90	
Columbus	77	25	47.6	5.52	
Corinth	69	15	42.2	5.81	0.2
Crystal Springs	77	28	52.4	4.82	
Duck Hill	74	19	48.6	3.18	
Edwards	76	27	53.4	5.73	
Enterprise	.....	.....	.....	6.56	
Fayette (near)	.....	.....	.....	5.42	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Mississippi—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville	78	22	50.9	3.66	
Greenwood	78	22	48.2	2.98	
Hattiesburg	79	28	54.4	2.94	
Hazlehurst	78	28	52.8	6.92	
Hernando	74	13	43.6	3.43	
Holly Springs	72	15	43.4	3.82	
Jackson	76	28	51.5	4.14	
Kosciusko	75	22	48.6	3.28	
Lake	78	23	49.6	6.09	
Lake Como	78	25	54.5	4.29	
Laurel	78e	26e	54.6e	4.14	
Leakesville	79	27	54.4	3.54	
Louisville	76	23	49.6	3.65	
McNeill	78	30e	56.6	6.35	
Macon	78	25	47.6	3.38	
Magee	76	26	51.0	4.97	
Magnolia	.....	.....	.....	2.52	
Merrill	.....	.....	.....	2.12	
Natchez	83	29	52.8	4.24	
Okolona	73	20	45.4	4.66	
Pearlington	77	30	56.6	5.80	
Pecan	76	31	56.6	2.51	
Pittsboro	72	19	46.3	3.07	
Pontotoc	72	18	46.6	4.15	
Porterville	75	24	49.9	6.33	
Port Gibson	82	26	53.4	6.35	
Quitman	76	25	52.9	5.57	
Ripley	75e	15b	46.2e	4.75	1.5
Shoccoe	76	26	52.5	8.61	
Shubuta	.....	.....	.....	4.38	
Suffolk	81	28	55.3	4.51	
Tchula	77	23	51.0	2.93	0.4
Tupelo	73	19	45.2	5.48	0.5
University	75	16	46.9	4.48	
Utica	77	20	53.2	4.71	
Walnutgrove	76b	25b	50.6b	6.43	
Watervalley	74	19	47.9	5.65	
Waynesboro	75	25	52.6	3.90	
Woodville	79	30	54.7	4.26	
Yazoo City	75	26	50.2	3.68	
Missouri.					
Albany	.....	.....	.....	0.50	5.5
Appleton City	69	— 4	33.9	0.61	3.0
Arlington	.....	.....	.....	0.82	
Arthur	70	— 7	36.4	0.20	2.0
Bagnell	.....	.....	.....	0.74	
Belle	72	0	35.8	0.77	3.5
Bethany	64	— 8	30.5	1.38	8.0
Birchtree	69	1	38.8	0.98	2.2
Bolivar	70	— 5	36.8	1.10	1.8
Boonville	.....	.....	.....	0.30	0.5
Brunswick	63	— 7	31.3	0.75	6.7
Cape Girardeau	.....	.....	.....	1.28	
Caruthersville	74	6	41.0	5.37	9.0
Clinton	69	— 3	36.0	0.48	1.8
Conception	59	—10	31.6	1.09	7.0
Darksville	62	— 9	31.4	0.92	9.2
Dean	77	10	40.8	0.65	T.
Decaturville	70d	— 6d	32.8d	1.08	1.3
De Soto	73	1	36.1	4.10	6.1
Doniphan	72	— 5	39.0	3.54	4.0
Eldorado Springs	71	— 5	37.4	1.19	5.5
Fairport	.....	.....	.....	1.15	7.5
Farmington	72	2	36.7	0.86	4.0
Fayette	68	— 2	34.5	0.72	7.5
Fulton	69	— 7	33.8	0.44	0.9
Gads Hill	74	2	35.6	0.95	3.9
Gano	74	— 1	36.8	1.36	4.0
Glasgow	.....	.....	.....	0.72	5.5
Goodland	73	1	36.6	1.34	2.5
Gorin	.....	.....	.....	0.05	0.5
Grant City	60	—11	29.4	0.62	5.0
Harrisonville	63	— 7	31.6	0.80	6.0
Hazlehurst	.....	.....	.....	0.90	6.0
Hermann	.....	.....	.....	1.22	0.7
Houston	72	— 9	38.0	1.96	2.2
Huntsville	.....	.....	.....	0.60	.....
Ironton	74	0	35.6	1.59	4.7
Jackson	72	5	38.5	1.28	4.7
Jefferson City	72	— 3	32.1	1.41	9.0
Joplin	74	4	40.4	0.24	1.1
Kidder	60	— 8	31.1	0.35	6.2
Koshkonong	72	6	40.0	1.88	0.5
Lamar	72	3	38.2	0.35	T.
Lamonte	.....	.....	.....	0.31	2.5
Lebanon	69	— 1	36.0	1.20	3.5
Lexington	63	— 5	33.3	0.86	5.5
Liberty	64	— 6	32.2	0.95	7.6
Lockwood	68	2	37.7	0.79	T.
Louisiana	68	—15	32.4	0.70	7.0
Macon	63	— 7	32.2	0.69	6.3
Marblehill	74	7	37.8	2.45	5.8
Marshall	65	— 7	32.4	0.70	5.0
Maryville	63	— 9	27.6	1.08	8.5
Mexico	68	—10	30.4	0.88	7.3
Monroe	64	— 9	30.7	0.48	4.0
Mountain Grove	69	0	37.3	3.47	2.5
Mount Vernon	72d	2d	38.4d	0.82	3.0
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Neosho	74	6	39.5	0.56	2.0
New Madrid	.....	.....	.....	5.13	
New Palestine	70	0	37.5	0.71	2.9
Oakfield	74	— 1	35.0	1.16	6.5
Olden	75	3	40.2	1.79	1.0
Oregon	59	—12	29.0	1.35	4.5
Osceola	.....	.....	.....	0.77	2.2
Rolla	.....	.....	.....	1.01	3.6
St. Charles	73	— 5	34.1	2.06	10.0
St. Joseph	.....	.....	.....	0.50	5.0
Sarcoxie	.....	.....	.....	0.70	1.4
Sedalia	63	0	34.4	0.62	6.0
Seymour	71	1	37.3	3.43	.....
Sikeston	72	1	38.9	4.47	6.0
Steffenville	63	— 8	30.2	1.18	5.0
Sublett	59	— 9	29.7	0.47	2.7
Trenton	54	—12	30.0	0.39	7.0
Unionville	58	—12	27.6	0.64	3.5
Versailles	70	— 2	34.3	0.63	3.3
Warrensburg	65	— 4	34.8	0.75	5.5
Warrenton	70	— 3	31.2	1.14	9.5
Warsaw	71	— 7	35.4	0.78	4.8
Wheatland	.....	.....	.....	1.00	3.0
Willowsprings	71	— 7	38.0	2.16	4.5
Montana.					
Absarokee	.....	.....	.....	0.61	14.5
Adel	57	—25	30.5	0.85	8.5
Anaconda	54	— 7	31.6	0.82	.....
Augusta	59	—30	31.0	0.40	4.0
Babb	52	—43	27.0	0.00	
Billings	67	—18	33.8	1.25	12.5
Bozeman	53	—14	29.0	0.80	8.5
Boulder	55	—21	27.2	0.52	5.7
Bowen	41e	—23e	19.0e	2.18	21.2
Broadview	63	—22	26.9	0.34	4.4
Butte	58	— 8	32.3	1.00	10.0
Canyon Ferry	51	—16	25.0	0.26	2.6
Cascade	60	—19	33.8	0.50	5.0
Chester	46	—42	16.6	0.50	5.0
Chinook	56	—43	12.9	0.22	2.2
Choteau	60	—32	31.0	.....	.....
Clear Creek	59	—31	24.5	0.85	8.5
Columbia Falls	53	—11	25.0	2.99	13.0
Copper	.....	.....	.....	0.86	11.0
Crow Agency	55	—18	26.1	0.92	7.2
Culbertson	44	—47	10.8	0.12	.....
Dayton	52	— 5	27.0	0.91	7.0
Decker	56	—33	23.0	0.70	3.0
Dillon	53	— 8	32.9	1.43	14.0
Ekalaka	56	—26	25.8	0.65	6.5
Ericson	.....	.....	.....	0.75	7.5
Evans	54	—26	30.7	1.00	10.0
Fallon	46	—30	15.8	0.04	.....
Fort Benton	59	—30	23.6	0.60	6.0
Fort Harrison	59	—17	28.2	.....	.....
Fort Logan	55	—20	30.9	1.80	18.0
Fortine	54	—21	26.1	1.30	8.2
Glasgow	36	—42	7.6	0.17	2.5
Glendive	47	—33	18.7	0.42	8.0
Gold Butte	57c	—20c	30.6c	0.61	5.6
Graham	60	—30	30.0	0.47	4.0
Grayling	44	—20	19.4	0.48	6.5
Greatfalls	60	—21	29.2	0.26	2.6
Hamilton	57	0	31.3	0.93	17.0
Homepark	.....	.....	.....	0.10	1.0
Huntley	62	—20	31.0	0.44	5.5
Jordan	50	—38	19.4	0.00	
Lake McDonald	.....	.....	.....	4.06	
Lewistown	60	—22	30.5	0.47	4.8
Livingston	57	—17	34.5	1.00	16.5
Lodge Grass	58f	—22f	28.5f	0.70	3.0
Malta	43	—43	12.0	0.80	8.0
Missoula	53	— 4	26.7	1.05	10.5
Mullets Ranch	.....	.....	.....	0.31	3.8
Norris	53	— 9	33.8	0.92	9.0
Nye	.....	.....	.....	0.98	13.0
Ovando	51	—12	23.2	1.71	16.5
Philipsburg	53	— 8	29.6	1.00	12.8
Plains	55	— 3	30.6	0.45	4.5
Polson	48	2	28.0	0.94	10.0
Poplar	45	—44	10.8	0.40	4.0
Raymond	.....	.....	.....	0.30	3.0
Redlodge	54	—27	28.8	0.80	12.0
Renovo	55	—10	33.0	0.54	5.2
Saltese	.....	.....	.....	3.50	12.0
Snowshoe	49	—10	29.7	6.44	15.0
Springbrook	48	—34	18.8	1.31	13.1
Steele	65	—24	31.2	0.45	4.5
Tokna	44	—31	17.0	1.30	13.0
Troy	54	4	33.6	1.55	.....
Utica	65	—24	31.1	0.08	1.0
Wolf Creek	57	—22	30.8	1.14	11.4
Nebraska					
Agate	63	—14	30.8	1.10	10.0
Ainsworth	66	—15	28.0	0.79	7.5
Albion	59	—19	27.0	1.20	12.0
Alliance	64	—10	33.2	0.60	6.0
Alma	73	— 6	32.6	0.27	1.5
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Arapaho	.....	.....	.....	0.50	4.0
Arcadia	.....	.....	.....	0.75	7.5
Ashland	61	—16	28.3	1.46	7.8
Ashton	.....	.....	.....	0.04	T.
Atkinson	66	—17	26.4	0.90	9.0
Auburn	64	—12	29.2	1.34	7.5
Aurora	63	—11	30.4	0.60	6.0
Beatrice	61	—10	29.6	2.34	10.0
Beaver	73	— 5	34.8	0.22	2.0
Bellevue	61	—13	27.4	1.98	11.5
Benkleman	.....	.....	.....	T.	T.
Blair	61	—16	27.7	1.22	5.1
Bloomfield	64	—28	24.8	0.78	9.0
Bradshaw	.....	.....	.....	0.90	9.0
Bridgeport	65f	— 8	34.0e	0.40	3.0
Burchard	.....	.....	.....	1.50	7.0
Burwell	.....	.....	.....	0.10	1.0
Callaway	65	— 9	32.4	T.	T.
Central City	.....	.....	.....	0.60	6.0
Chester	.....	.....	.....	1.00	4.0
Cody	.....	.....	.....	0.40	4.0
Columbus	62	—17	26.4	1.07	10.0
Crete	62	—12	29.4	1.42	6.9
Culbertson	70	— 4	33.0	0.16	0.5
David City	60	—15	27.7	1.16	9.8
Dawson	67	— 8	30.0	0.50	.....
Dubois	.....	.....	.....	1.21	5.5
Duff	.....	.....	.....	0.65	6.5
Dunning	.....	.....	.....	0.30	3.0
Edgar	.....	.....	.....	0.90	9.0
Ellis	.....	.....	.....	2.00	9.0
Ericson	.....	.....	.....	0.95	9.5
Ewing	64	—22	25.6	0.70	7.0
Fairbury	64	— 9	29.9	1.68	7.6
Fairmont	67	—16	26.4	0.95	5.0
Fort Robinson	66	—16	30.4	1.07	11.0
Franklin	71	— 7	33.3	0.48	4.8
Fremont	60	—15	26.8	1.02	7.5
Fullerton	.....	.....	.....	1.03	10.8
Geneva	62	—14	29.6	1.12	6.7
Genoa (near)	57	—16	28.2	1.50	11.0
Gering	.....	.....	.....	0.36	2.5
Gosper	.....	.....	.....	0.10	2.0
Gothenburg	67	— 7	33.0	0.40	4.0
Grand Island	64	— 5	29.5	0.84	.....
Grant	70b	—10b	34.4e	0.05	0.5
Greeley	.....	.....	.....	1.30	18.0
Guide Rock	.....	.....	.....	0.87	2.5
Halsey	68	—11	29.9	0.10	1.0
Hartington	62	—25	24.5	0.90	9.0
Harvard	61	—11	27.5	1.12	7.9
Hastings[1]	60	—10	27.0	0.87	7.0
Hayes Center	67	— 6	34.8	0.13	0.5
Hay Springs	68	—17	30.6	0.70	7.0
Hebron	63	—10	29.8	0.98	4.8
Hendley	.....	.....	.....	0.20	2.0
Hickman	.....	.....	.....	1.00	5.0
Holdrege	.....	.....	.....	0.55	5.5
Hooper[1]	58	— 6	25.6	0.89	6.9
Imperial	69	— 4	34.6	0.04	0.5
Kennedy	66	—18	29.6	0.85	8.5
Kimball	66	— 7	36.0	0.15	1.5
Kirkwood	69	—20	26.8	0.75	7.5
Leavitt	63	—10	27.3	0.23	2.2
Lexington	63	— 8	29.8	0.80	8.0
Lodgepole	67j	— 6j	33.4j	.....	.....
Loup	62	—15	28.0	0.38	7.0
Lynch	68	—29	26.6	1.10	11.0
McCook	.....	.....	.....	T.	T.
McCool	.....	.....	.....	1.12	7.5
Madison	60	—20	26.8	1.00	9.0
Marquette	.....	.....	.....	0.80	8.0
Mason	.....	.....	.....	0.65	6.5
Merriman	.....	.....	.....	0.30	3.0
Minden	64	— 9	29.5	0.48	5.4
Monroe	.....	.....	.....	1.00	6.7
Nebraska City	63	—17	28.6	1.60	12.5
Nemaha	.....	.....	.....	0.97	7.8
Norfolk	64	—22	26.4	1.17	12.5
North Loup	65	—15	30.0	0.72	10.0
Oakdale	59	—20	24.2	0.77	6.2
Oakland	60	—22	27.8	0.99	.....
Odell	.....	.....	.....	0.95	5.0
Ord	.....	.....	.....	0.94	.....
Osceola	59	—13	28.2	1.10	11.0
Palmer	.....	.....	.....	0.55	5.5
Palmyra[1]	68	—10	28.4	1.40	6.0
Pawnee City	61	— 9	28.2	1.00	4.5
Plymouth	63	— 6	30.6	0.90	6.0
Purdum	63	—12	29.1	0.75	5.7
Ravenna	64	—10	29.5	0.84	8.4
Redcloud	70	— 6	32.1	0.20	2.0
Republican	.....	.....	.....	0.20	2.0
Rulo	.....	.....	.....	1.20	7.0
St. Paul	63	—11	29.7	1.08	8.7
Santee	70	—25	27.2	1.40	14.2
Schuyler	.....	.....	.....	1.40	14.0
Scottsbluff	67	— 9	33.4	0.62	6.0

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Seward	63	−15	26.1	1.47	12.2
Springview	65	−20	27.0	0.80	8.0
Stanton	65	−15	25.3	1.07	9.7
Strang	.....	.....	.....	0.30	3.0
Stratton	.....	.....	.....	0.00	
Superior	70	− 6	31.8	0.50	4.0
Syracuse	.....	.....	.....	1.35	7.0
Tablerock	.....	.....	.....	1.72	8.0
Tecumseh	72	−13	32.8	1.47	8.0
Tekamah	62	−15	27.4	1.57	6.8
Turlington	62	− 13	28.0	1.78	10.0
University Farm	63	−15	28.9	1.27	5.0
Wahoo	.....	.....	.....	1.60	8.0
Wakefield	61	−27	25.2	1.04	10.4
Watertown	.....	.....	.....	0.70	7.0
Wauneta	.....	.....	.....	0.00	.....
Weeping Water	.....	.....	.....	1.93	10.0
Westpoint	62	−20	27.4	0.20	2.0
Wilber	.....	.....	.....	1.20	6.0
Wilsonville	.....	.....	.....	0.10	1.0
Winnebago	62	−32	24.1	1.12	14.2
Wisner	.....	.....	.....	0.58	9.0
Wymore	.....	.....	.....	1.75	10.0
York	61	−11	28.9	1.45	9.5
Nevada.					
Aura	50	13	34.5	8.03	15.6
Battle Mountain	.....	.....	.....	0.03	T.
Beowawe	.....	.....	.....	0.30	3.0
Carlin [1]	47	25	34.5	0.19	
Carson Dam	67	26	46.2	T.	T.
Clover Valley	.....	.....	.....	8.14	
Columbia	64	22	43.8	0.82	T.
Dyer	65	9	37.3	2.00	T.
Elko [1]	70	30	41.2	0.81	
Eureka	58	20	40.4	0.78	3.5
Fallon	72[a]	22[a]	45.4[a]	0.30	T.
Fernley	67[a]	24[a]	46.2[a]	0.05	
Geyser	59	14	35.6	0.99	3.5
Golconda	.....	.....	.....	1.25	
Hamilton	62	15	37.8	1.90	10.0
Hazen	69	27[4]	50.2[b]	0.09	
Humboldt [1]	60	23	35.4	0.30	
Lewers Ranch	69	18	45.9	2.45	T.
Logan	78	33	56.8	0.95	
Mill City [1]	64	26	41.3	0.13	
Palmetto	63	16	39.2	1.90	5.0
Paradise Valley	.....	.....	.....	1.90	
Pioche	59	17	39.5	1.39	5.0
Potts	54	15	36.8	0.65	
San Jacinto	56	15	38.1	0.90	T.
Squaw Valley	63	20	40.6	2.79	.....
Tecoma	58	20	38.0	0.43	4.0
Wabuska	68	19	43.7	0.15	
Wadsworth	72	21	49.7	0.00	
New Hampshire.					
Alstead	42	−13	13.3	1.12	29.0
Bartlett	.....	.....	.....	2.45	34.5
Bethlehem	42	−19	8.6	1.90	19.0
Brookline	48	−20	18.2	1.85	20.8
Durham	50	−15	18.3	1.98	17.0
Franklin Falls	45	−13	14.6	1.33	17.5
Grafton	45	−20	11.6	1.20	14.0
Groveton	.....	.....	.....	0.79	19.2
Hanover	45	−26	12.8	0.93	15.5
Keene	44	−23	14.4	1.48	19.0
Littleton	41	−17	7.5	1.73	21.5
Nashua	49	−16	19.0	1.87	19.8
Newton	47	−20	16.5	2.06	24.5
North Woodstock	.....	.....	.....	1.36	
Plymouth	41	−13	15.6	1.24	15.8
New Jersey.					
Asbury Park	53	0	26.0	2.64	17.8
Bayonne	44	− 1	22.8	2.61	22.2
Belvidere	46	− 9	21.2	3.10	26.0
Bergen Point	45	0	23.2	2.88	27.5
Beverly	51	− 1	24.2	2.98	28.0
Bridgeton	52	2	27.5	1.82	12.8
Canton	.....	.....	.....	2.51	8.5
Cape May C. H.	52	5	28.8	3.00	22.1
Clayton	51	− 1	25.6	2.19	12.5
Dover	42	− 6	19.2	3.57	28.5
Elizabeth	44	0	24.5	2.24	18.0
Englewood	41	0	22.4	2.61	23.0
Flemington	43	− 9	21.6	2.72	22.0
Friesburg	54	− 5	25.8	2.24	11.9
Hightstown	47	−11	21.7	1.92	18.1
Imlaystown	47	−10	23.4	2.30	16.5
Indian Mills	47	2	26.5	3.45	17.5
Jersey City	45	0	24.5	3.06	23.5
Lakewood	55	− 3	26.4	2.76	15.0
Lambertville	42	− 2	23.4	2.86	26.2
Layton	43	−22	17.0	2.92	22.0
Moorestown	48	0	24.1	2.86	19.3
Newark	45	− 2	23.0	3.72	31.0
New Brunswick	43[a]	− 5[b]	21.0[b]	2.35	22.0
Newton	44	−12	19.3	2.39	22.5
Oceanic	53	0	25.7	2.58	17.7
Paterson	46	2	24.4	2.76	24.6

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Phillipsburg	44	− 2	21.8	2.27	20.5
Plainfield	45	− 5	22.8	2.81	24.0
Pleasantville	.....	.....	.....	1.89	.....
Rancocas	.....	.....	.....	2.83	20.0
Rivervale	44	−21	17.8	3.90	35.0
Somerville	44	−10	21.9	2.68	25.5
South Orange	45	− 1	21.9	2.86	28.0
Sussex	41	− 9	19.2	2.21	19.5
Toms River	55	− 6	24.1	2.42	18.2
Trenton	50	− 2	26.6	2.53	18.0
Tuckerton	52	1	26.2	2.95	10.7
Vineland	55	0	26.8	2.93	13.0
Woodbine	54	1[d]	26.3[e]	1.99	12.0
New Mexico.					
Alamagordo	74	26	49.2	0.07	
Albert	75	13	48.2	0.04	T.
Albuquerque	67	28	49.6	0.00	
Alto	.....	.....	.....	0.63	4.6
Artesia	77	20	49.8	0.00	
Bellranch	74	15	45.6	0.00	
Bloomfield	64	12	41.3	0.25	0.1
Cambray	.....	.....	.....	0.00	
Carlsbad	80	22	51.4	0.00	
Chama	52	10	33.4	1.70	17.0
Cimarron	69	11	41.6	0.06	
Cliff	74	21	48.0	0.65	
Cloudcroft	55	11	34.2	0.43	3.8
Datil	80	12	47.4	0.25	T.
Deming	64	27	46.2	0.08	
Dulce	60	14	37.0	1.20	6.0
Eagle Rock Ranch	64	13	38.9	0.28	T.
Elizabethtown	51	12	33.0	T.	T.
Elk	75	26	48.1	T.	
El Vado	59	12	37.2	1.12	2.0
Engle	70[a]	22[a]	49.6[a]	0.00	
Espanola	67[a]	15[a]	42.2[a]	0.13	T.
Estancia	66	10	39.6	0.21	T.
Fort Bayard	72	20	47.3	0.30	
Fort Stanton	66[a]	12[a]	42.3[a]	0.52	2.5
Fort Union	67	10	39.6	T.	T.
Fort Wingate	67	19	40.4	0.88	3.0
Frisco	70	19	44.3	0.63	.....
Fruitland	65	15	41.1	0.22	0.5
Gage	76	26	47.6	0.11	
Glen	74	18	48.7	0.00	
Hillsboro	73	25	49.9	T.	
Hope	.....	.....	.....	0.00	
Laguna	65	20	43.4	T.	
Lagunita	76	20	47.0	T.	
Lake Valley	.....	.....	.....	0.09	T.
Las Vegas	70	12	41.4	0.01	T.
Lordsburg	79	27	50.7	0.51	
Los Alamos	.....	.....	.....	T.	T.
Los Lunas	70	18	44.6	0.12	
Luna	64	12	36.6	0.88	
Magdalena	66	15	42.8	0.43	2.0
Manuelito	.....	.....	.....	0.84	2.0
Mesilla Park	77	21	50.6	T.	
Mimbres	.....	.....	.....	0.14	
Mineral Hill	.....	.....	.....	0.23	1.0
Monument	79	17	50.2	0.00	
Mountain Air	85	19	44.7	0.31	3.0
Nara Visa	.....	.....	.....	0.01	T.
Orange	78	18	49.6	0.00	
Red River	.....	.....	.....	0.55	5.5
Redrock	.....	.....	.....	0.45	
Rincon	77	20	50.4	0.16	
Rociada	63	12	39.2	0.61	8.0
Rosa	.....	.....	.....	0.14	
Rosedale	63	22	42.8	0.19	0.5
San Marcial	72	21	49.3	0.00	
San Rafael	67	18	42.2	0.15	0.5
Socorro	74	21	47.8	0.10	
Springer	70	12	40.9	0.00	
Strauss	.....	.....	.....	T.	T.
Taos	64	16	42.2	0.23	2.1
Tres Piedras	55	8	32.9	0.35	0.6
Tucumcari	76	16	49.2	0.00	
Valley	.....	.....	.....	T.	T.
Vermejo	67	12	39.6	T.	
Winsor	59	7	35.2	1.18	11.8
New York.					
Adams	50	−16	14.8	0.60	6.0
Addison	49	−10	21.1	0.60	4.0
Allegany	50	−11	18.8	1.52	13.4
Amsterdam	59	−1[1]	14.4	0.48	6.0
Angelica	45	−14	17.6	1.00	9.0
Appleton	48	− 1	21.0	0.77	4.7
Athens	42	− 8	18.0	1.33	15.7
Atlanta	48	−11	18.8	.....	.....
Atwater	.....	.....	.....	0.89	9.8
Auburn	44	− 5	18.5	1.50	18.0
Avon	46	− 5	19.0	0.78	7.7
Baldwinsville	46	− 9	17.0	2.46	19.0
Balston Lake	39	−19	14.0	0.94	10.2
Bedford	47	−12	19.2	2.18	22.5
Blue Mountain Lake	.....	.....	.....	1.30	13.0
Bolivar	48	−12	18.5	0.58	6.5

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New York—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bouckville	39	−18	13.2	1.78	12.5
Brockport	45	− 4	19.2	1.02	17.0
Cape Vincent	39	−12	14.4	1.50	14.0
Carmel	42	−23	15.2	2.84	22.8
Carvers Falls	39	−27	10.8	1.17	18.0
Chatham	43	−12	16.6	1.44	13.2
Chazy	40	−13	12.5	0.62	6.0
Coeymans	44	− 9	19.2	1.60	16.0
Cooperstown	44	−14	13.4	1.30	11.5
Cortland	40	−14	15.2	2.21	30.0
Cutchogue	45	2	23.7	3.09	15.0
De Ruyter	40	−13	16.2	1.70	15.6
Elba	42	− 7	18.1	1.09	10.0
Faust	40	−30	8.0	2.42	12.8
Fayetteville	44	−13	17.4	0.85	10.0
Fort Plain	43	−13	16.2	1.26	12.5
Franklinville	48	−16	16.7	1.16	11.1
Gabriels [4]	42	−27	9.4	.....	.....
Gansevoort	.....	.....	.....	2.55	24.0
Glens Falls	40	−21	13.3	1.43	15.0
Gloversville	39	−16	12.8	1.44	14.0
Greenfield	39	−13	14.3	0.99	.....
Greenwich	40	−20	13.4	1.07	10.0
Griffin Corners	46	−16	14.1	1.27	12.5
Harkness	43	−12	12.6	0.41	6.0
Haskinville	.....	.....	.....	0.65	6.5
Hemlock	49	− 6	18.1	0.32	3.2
Hunt	54	−10	21.2	0.95	7.0
Indian Lake	39	−27	10.4	0.93	9.5
Ithaca	45	− 5	18.1	2.00	20.8
Jamestown	49	− 9	20.8	1.20	12.0
Jeffersonville	45	−22	15.2	2.14	20.5
Keene Valley	45	−13	12.8	0.65	6.5
Lake George	42	−20	12.8	1.28	12.4
Le Roy	50	− 7	19.2	0.86	8.3
Liberty	41	−10	14.2	1.98	14.5
Littlefalls, City Res.	37	−14	13.8	1.11	15.0
Lockport	44	− 3	19.4	0.78	.....
Lowville	40	−16	11.8	0.62	8.0
Lyons	44	− 3	20.6	3.23	27.0
Middletown	43	− 5	18.4	1.95	18.0
Mohonk Lake	45	− 6	16.7	2.57	20.0
Moira	45	−14	11.0	2.20	22.0
Mount Hope	45	−15	19.7	3.29	29.5
Newark Valley	.....	.....	.....	1.35	14.0
New Lisbon	41	−17	12.6	1.30	12.0
North Hammond	43	−18	11.8	.....	.....
North Lake	35	−39	6.6	1.30	13.0
Ogdensburg	43	−17	12.1	0.65	6.5
Oneonta	45	− 9	17.7	1.60	16.0
Otto	47	− 9	22.9	0.58	5.8
Oxford	41	−11	16.0	1.85	18.5
Oyster Bay	45	0	23.4	2.42	22.0
Perry City	44	−13	17.3	1.18	11.8
Plattsburg	42	−12	13.4	1.03	10.5
Port Jervis	44	−12	18.9	1.72	15.0
Richland	30	− 1	12.1	1.10	11.0
Romulus	45	− 3	19.8	0.95	9.5
Rose	44	− 7	18.3	1.84	14.7
Salisbury Mills	41	−23	14.0	2.25	17.5
Saranac Lake	45	−24	10.8	0.71	4.6
Scarsdale	46	− 4	21.0	4.59	37.0
Setauket	45	3	23.2	3.09	22.8
Shortsville	49	− 3	19.1	0.67	6.7
Skaneateles	.....	.....	.....	1.34	.....
Southampton	42	3	24.6	3.66	15.3
South Canisteo	49	−16	18.6	1.40	12.5
Spier Falls	41	−20	12.8	1.29	16.0
Taberg	41	−22	14.5	1.63	14.9
Ticonderoga	43	−14	13.8	0.38	3.5
Volusia	4[b]	− 8	18.6	1.01	6.5
Wading River	43	0	21.4	1.60	10.0
Wappinger Falls	42	−24	15.9	2.40	17.0
Warwick	.....	.....	.....	1.59	20.0
Watertown	45	−15	15.0	0.88	7.5
Waverly	48	−15	18.9	1.33	12.5
Wedgwood	42	− 8	17.2	1.03	11.0
West Berne	45	−22	15.2	1.30	13.0
Westpoint	40	− 5	19.8	2.20	20.0
Windham	50	−13	14.8	1.77	12.5
Youngstown	.....	.....	.....	0.64	8.8
North Carolina.					
Battleboro	.....	.....	.....	3.96	1.4
Beaufort	66	26	44.4	4.21	
Brevard	67	16	39.8	3.06	T.
Brewers	73	14	38.3	2.29	2.0
Bryson City	.....	.....	.....	3.11	T.
Buck Springs	60	5	55.4	0.55	2.0
Caroleen	68	20	42.6	2.34	T.
Chalybeate Springs	69	12	39.2	4.84	1.0
Chapelhill	66	14	37.8	4.92	.....
Clinton	69	10	43.5	3.22	6.0
Eagletown	67	15	38.6	4.36	1.7
Edenton	64	16	39.3	3.85	6.0
Fayetteville	72	16	41.8	3.72	4.2
Goldsboro	67	14	38.0	3.55	.....
Graham	.....	.....	.....	3.08	3.3
Greensboro	62	15	38.4	4.02	4.0

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
North Carolina—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville				3.12	
Henderson	64	13	37.8	4.50	5.0
Hendersonville	68	15	40.0	1.69	
Horse Cove	64	16	40.3	3.32	0.2
Hot Springs	71	19	40.8	2.21	0.6
Kinston	72	9	42.6	2.39	9.0
Lenoir	61	15	38.4	2.95	
Lexington	67	14	38.8	4.87	3.1
Lincolnton	68	16	41.5		
Louisburg	65	15	38.9	4.25	3.0
Lumberton	73	11	41.6	4.08	9.0
Marion	66	16	41.1	2.12	1.5
Marshall	67	16	40.6	2.15	2.3
Moncure	67	15	39.6	5.24	
Monroe	66	13	40.0	3.62	2.0
Morganton	65	15	39.0	1.64	1.8
Mountairy	63	11	36.8	1.95	2.5
Mount Holly				2.90	
Murphy				4.71	
Nashville	68	13	39.4	5.18	0.8
Newbern	74	18	42.8	3.41	2.5
Patterson[a,b]	60	14	35.9	1.97	3.0
Pinehurst	72[c]	15[c]	42.5[c]	5.97	1.2
Pink Beds	60	8	35.2	3.82	
Rockingham	71	22	44.2	5.10	
Randleman				3.53	2.5
Reidsville	64	13	39.2	2.54	6.7
Salem	64	15	38.6	2.47	3.0
Salisbury	66	15	39.6	3.29	4.0
Sapphire	61	14	39.2	2.65	T.
Saxon	62	14	36.8	1.55	6.0
Scotland Neck	68	15	41.1	3.98	1.2
Selma	69	16	39.4	7.95	
Settle	66	11	39.2	1.23	4.0
Sloan	69	18	43.5	4.01	2.0
Snowhill	70	7	41.4	3.45	5.5
Southern Pines	70	14	42.2	5.18	
Southport	72	22	45.8	1.97	T.
Statesville	65	10	41.0	2.16	0.6
Tarboro	70	15	38.4	4.84	2.6
Vade Mecum	65	9	36.8		
Wash Woods	58[c]	20[c]	36.8[d]	5.18	6.0
Waynesville	65	15	40.0	2.36	T.
Weldon	66	15	37.2	4.23	4.7
North Dakota.					
Aplin	41	−36	13.8	0.15	1.5
Amenia	43	−39	8.0	0.40	4.0
Beach	49	−29	18.3	0.66	6.0
Berlin	52	−38	12.7	0.35	3.5
Bottineau	38	−35	8.0	0.05	
Buford	42	−47	12.4	0.30	3.0
Cando	37	−43	5.3	0.05	
Chilcot				0.32	3.2
Coalharbor	43	−41	12.0	0.22	2.2
Cooperstown	42	−40	7.4	0.01	0.1
Dickinson	48	−31	15.6	0.14	2.4
Donnybrook	44	−39	10.8	0.20	2.0
Dunseith	41	−48	5.8	0.10	1.0
Edgeley	49	−35	13.5	0.06	0.6
Edmore	50	−44	3.4	0.00	
Forman	47	−33	13.2	0.30	3.0
Fort Berthold	57	−43	13.9	0.12	3.0
Fort Yates	58	−27	19.4	0.57	5.0
Fullerton	42	−35	14.0	0.63	6.3
Gladys	39	−42	9.5	1.42	12.0
Glenullin	46	−32	15.3	0.64	6.7
Grafton	40	−37	10.0	0.02	0.5
Granville	40	−44	7.6	0.21	1.5
Hamilton	40	−38	7.2	0.02	0.7
Hillsboro	38	−38	9.6	0.30	3.3
Hurd	54	−25	18.5	0.16	2.0
Jamestown	47	−38	14.2	0.50	5.0
Kulm	50	−32	15.5	0.72	8.7
Lakota	36	−40	3.7	0.97	5.0
Langdon	41	−36	6.9	0.00	
Lisbon	43	−37	13.7	0.20	2.0
McKinney	44	−47	9.4	T.	
Manfred	38	−42	10.4	0.20	2.0
Mayville	54	−37	9.3	0.12	1.2
Medora				0.25	2.5
Melville	48	−36	11.7	T.	T.
Minot	44	−45	11.0	0.18	1.8
Minto	41	−35	6.8	0.14	
Moyersville [f]	41	−41	11.8		
Napoleon	40	−40	9.0	0.10	1.0
New Salem	46	−37	14.6	0.61	5.0
Oakdale	55	−34	16.6	0.60	6.0
Oriska	42	−33	12.0	0.52	5.2
Palermo	51	−43	7.9	0.12	1.2
Park River	38	−36	8.5	0.09	0.9
Pembina	39	−38	3.2	0.37	3.7
Portal				T.	T.
Power	42	−40	10.2	0.20	2.0
Pratt	37	−48	7.8	0.10	1.0
Steele	42	−39	11.1	0.30	3.0
University	37	−39	7.6	0.10	1.0
Valley City	43	−37	13.1	0.35	3.5
Wahpeton	48	−36	13.4	0.10	1.0
Walhalla	41	−35	9.4	T.	T.
White Earth				T.	T.
Willow City	42	−43	6.4	T.	T.
Ohio.					
Akron	49	− 2	22.2	1.33	11.0
Amesville	59	−19	29.6	1.91	6.5
Atwater				1.17	8.5
Bangorville	50	− 3	24.0	1.52	9.7
Bellefontaine	55	− 6	25.2	1.15	5.2
Benton Ridge	53	− 1	26.0	0.85	8.2
Bladensburg	51	− 5	24.6	1.23	3.0
Bowling Green	54	− 5	23.6	0.10	1.0
Bucyrus	49	− 5	23.8	1.62	11.2
Cadiz	51	− 2	26.7	1.20	10.1
Cambridge	53	−13	28.6	0.76	4.0
Camp Dennison	60	− 5	30.4	0.60	1.7
Canal Dover	50	−13	23.8	1.20	5.0
Canton	47	− 1	24.2	1.34	7.9
Cardington	49	−11	24.4	1.05	9.9
Circleville	58	− 5	28.2	0.29	2.0
Clarington	51	− 5	29.0	2.01	8.3
Clarksville	58	− 2	29.4	0.97	2.5
Cleveland [b]	50	1	22.6	0.88	8.6
Dayton	58	1	29.0	0.42	1.8
Defiance	65	− 5	25.1	0.25	2.9
Delaware	53	− 5	25.8	0.49	2.9
Demos	52	1	27.5	1.74	9.7
Findlay	57	0	26.1	0.34	3.0
Frankfort	55	−13	29.6	1.15	8.0
Fremont	53	− 3	25.0	0.10	1.1
Garrettsville	48	−14	22.4	1.14	8.3
Granville	54	− 2	27.2	0.70	3.2
Gratiot	52	− 6	26.9	0.88	5.8
Green	65	− 9	32.0	2.03	5.5
Greenhill	49	−16	21.9	0.92	7.3
Greenville	59	− 2	27.4	0.61	1.2
Hedges	53	− 6	24.6	T.	T.
Hillhouse	50	− 9	21.8	0.52	2.0
Hiram	48	− 4	21.0	0.74	5.5
Hudson	45	− 5	21.1	1.30	5.0
Ironton	66	− 3	33.9	2.09	6.2
Jacksonburg	60	3	28.7	0.85	2.0
Jeffersonville	55	1	28.2	0.58	1.2
Kenton	54	− 1	23.1	0.25	1.0
Killbuck	51	− 5	25.1	0.86	5.0
Lancaster	55	− 1	29.0	0.82	4.0
Lima	54	− 8	25.2	0.30	3.0
McConnelsville	55	− 7	28.5	1.12	5.7
Marietta	56	− 4	32.4	1.81	8.0
Marion	54	− 3	25.7	0.79	7.5
Medina	49	−11	22.2	0.61	5.0
Milfordton	51	− 8	24.4	1.31	7.5
Milligan	54	−17	28.2	0.76	4.0
Millport	50	−16	23.1	1.16	8.2
Napoleon	57	0	26.0	0.21	2.0
New Alexandria	58	− 3	25.8	0.90	9.0
New Berlin	46	− 8	22.4	0.81	4.5
New Bremen	57	− 5	27.0	0.23	0.5
New Richmond	60	3	31.0	0.71	1.6
New Waterford	50	−16	23.5	1.66	14.0
North Lewisburg	55	− 1	26.5	1.05	6.0
North Royalton	47	− 8	20.2	0.77	7.1
Norwalk	57[b]	−10[c]	21.6[c]	0.46	4.3
Oberlin	54	− 5	23.6	0.59	6.9
Ohio State University	54	− 3	27.0	0.59	1.3
Orangeville	48	−13	21.3	0.75	5.0
Ottawa	53	− 7	24.2	0.35	3.2
Pataskala	54	− 1	26.9	0.87	3.8
Philo	50	0	28.3	1.00	4.7
Plattsburg	54	− 4	26.8	0.83	3.5
Portsmouth	65	0	34.3	1.56	6.6
Pulse	55	−15	29.2	1.34	4.0
Rittman	46	− 2	24.0	0.51	3.1
Rockyridge	53	− 4	23.8	0.07	1.2
Shenandoah	54[c]	− 5[a]	22.0[b]	0.53	3.9
Sidney	58	− 3	27.6	6.30	2.5
Somerset	53	0	28.6	0.64	4.0
South Lorain	54	− 7	23.4	0.79	5.1
Springfield				0.29	0.7
Summerfield	57	−14	27.8	1.43	7.0
Thurman	61	− 9	31.7	1.88	7.0
Tiffin	50	1	24.4	0.35	3.0
Toledo (St. Johns College)	53	− 1	23.2	0.39	3.7
Upper Sandusky	53	− 5	25.8	0.58	4.8
Urbana	63	− 6	26.0	0.36	3.2
Vickery	49	−12	23.0	0.24	2.3
Warren	49	−10	22.9	1.22	8.2
Wauseon	55	− 3	22.9	0.32	2.7
Waverly	64	−11	31.2	1.16	5.4
Waynesville	57	− 3	28.2	0.70	1.5
Wellington	54	− 4	24.4	0.43	5.5
Willoughby				0.92	3.0
Wilson	61	−16	30.4	1.52	4.0
Wooster	50	− 5	24.6	1.09	6.5
Zanesville				1.43	5.5
Oklahoma.					
Alva	81	5	42.5	0.45	T.
Arapaho	80	7	44.2	0.55	T.
Oklahoma—Cont'd.	°	°	°	*Ins.*	*Ins.*
Beaver				0.00	
Cache	84	10	45.9	0.05	
Chandler	85	10	43.2	0.50	
Chattanooga	82	13	46.9	T.	
Cloud Chief	88	9	45.2	0.25	
Dacoma	81	7	41.4	0.45	
Eldorado	83	10	48.4	0.00	
Enid	80	6	41.2	0.97	
Erick				0.57	
Fort Sill	81	11	46.8	1.00	
Frederick	85	14	51.6	T.	
Gage	76	− 7	40.6	0.18	
Grand	75	4	39.2	0.15	
Guthrie	80	10	43.4	0.41	T.
Harrington	75	4	43.3	0.12	
Helena	79[d]	6[d]	41.2[d]	0.70	
Hennessey	79	8	44.7	1.30	
Hobart	82	10	45.9	0.05	T.
Holdenville	81	15	41.0	0.23	
Hooker	90	4	43.6	T.	
Jefferson	77	8	41.0	0.88	
Kenton	72	7	44.2	T.	T.
Kingfisher	79	10	43.4	1.07	T.
McComb	78	11	43.5	1.05	
Meeker	80	11	43.4	0.00	
Neola	78	10	45.1	0.27	
Norman	64	11	40.2	0.43	
Okeene	80	8	43.6	0.75	
Pawhuska	79	9	42.6	0.37	T.
Perry	80	8	41.6	0.54	
Sac and Fox Agency	78[h]	11	41.6[f]	0.61	
Shawnee	81	10	46.0	0.23	
Snyder	83	12	46.2	0.02	
Stillwater	79	9	40.4	0.09	
Taloga	76	10	39.9	0.33	
Temple	90	14	48.2	0.25	
Waukomis	82	9	44.2	1.20	
Weatherford	78	8	44.2	T.	T.
Whiteagle	79	7	41.0	0.76	
Oregon.					
Alba				1.33	
Albany	65	30	46.2	4.81	
Ashland	66	26	47.8	3.82	
Astoria	58	34	46.9	13.65	
Aurora (near)	60	29	44.4	4.90	
Bay City	67	30	47.3	11.58	T.
Bend	63	16	39.6	4.00	20.5
Blalock	60	20	40.0	1.29	5.0
Buckhorn	70	28	48.4	10.24	
Bullrun	64	30	43.0	8.58	4.5
Burns	59	20	39.6	2.36	9.0
Carlton	68	22	44.5	4.66	4.5
Cascade Locks	55	22	39.0	9.33	
Coquille				10.14	
Corvallis	66	29	46.9	5.38	
Dale				2.92	7.5
Dayville	70	25	44.2	2.12	8.0
Doraville	60	28	42.6	4.18	7.0
Drain	70	31	50.0	7.97	
Echo	68	17	38.5	1.32	6.0
Ella	66	16	37.5	1.36	4.0
Eugene	64	31	47.0	6.07	
Fairview	77	33	51.1	12.57	
Falls City	60	30	44.1	9.00	0.5
Forestgrove	63	24	42.6	4.52	4.5
Gardiner	70	35	50.2	11.45	
Glendale	70	29	47.8	6.52	
Glenora	61	27	43.6	13.21	3.0
Gold Beach	77	30	50.6	18.66	
Government Camp	58	14	37.0	8.00	18.0
Granite	59	6	35.2	1.30	
Grants Pass	70	27	48.0	3.99	
Grass Valley	48	21	37.4	0.48	11.0
Heisler	65	17	40.3	2.21	12.5
Heppner	60	15	38.0	1.94	7.0
Hermiston				1.79	6.0
Hood River	58	21	39.4	3.72	18.5
Huntington	63	26	41.9	1.17	9.0
Jacksonville	68	26	47.4	4.17	
Joseph	56	14	37.2	1.78	16.5
Kalmath	60	22	42.5	3.33	2.0
Lagrande	61	20	40.8	3.02	12.0
Lakeview	64	10	40.0	4.53	
Lost River	64	20	42.0	3.42	1.0
McKenzie Bridge	76	25	45.0	12.28	
McMinnville	62	29	46.2	4.56	3.5
Marshfield	79	32	50.3	11.76	
Mill City	63	30	45.2	6.90	
Monroe	61[h]	30[h]	46.8[h]	9.71	
Mountain Park	58	17	37.6	9.36	23.0
Mount Angel	64	25	46.6	6.35	1.0
Nehalem				11.96	
Newport	69	33	50.6	10.62	
Odell				4.40	
Olex	62	15	38.4	1.56	10.5
Ontario				0.95	
Orseco	58	22	41.0	15.90	25.7
Paisley	60	23	42.4	1.67	3.0

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Oregon—Cont'd.	°	°	°	*Ins.*	*Ins.*
Pendleton	60	17	37.7	2.13	8.0
Port Orford	76	36	50.3	17.21	
Prineville	62	15	38.7	2.67	12.2
Prospect				10.23	1.0
Richland	63[d]	25[d]	42.9[d]		
Salem	60	32	46.8	4.34	
Silver Lake	66	17	39.4	2.04	
Sparta	57	17	37.3	1.33	11.5
Stafford	60	30	44.7	5.96	4.0
Sumpter	47	6	29.8	3.77	35.0
The Dalles	59	21	39.1	3.08	33.0
Toledo	63	30	48.0	12.81	
Umatilla	65	19	38.4	0.98	0.6
Vale	65	25	41.3	1.03	4.0
Van				1.80	8.0
Wallowa	57	12	35.8	2.12	11.5
Wamic				2.45	24.5
Warm Spring	62	16	38.3	2.83	16.0
Weston	59	10	35.6	2.65	13.0
Williams	89	24	50.2	5.19	
Pennsylvania.					
Aleppo	54	—14	28.4	1.99	12.0
Altoona	49	—10	21.2	1.50	
Baldwin	47	—10	21.8	1.94	13.0
Beaver Dam				1.25	
Bellefonte	47	— 7	24.0	1.71	15.0
Browers Lock				2.83	
California	54	—30	30.2	1.68	8.8
Cassandra	50	—11	23.1	1.69	16.0
Clarion				1.62	9.4
Claysville	52	—10	27.3	1.54	7.8
Clearfield				1.73	9.0
Coatsville	49	0	23.7	4.37	31.2
Confluence				3.53	34.3
Davis Island Dam				1.27	10.7
Derry	55	—12	27.8	2.04	16.5
Doylestown				3.16	
Drifton	45	—10	22.0	2.23	14.2
East Mauch Chunk	46	—11	19.8	2.20	19.5
Easton	45	— 1	23.2	2.15	19.5
Ellwood Junction				0.98	9.2
Emporium	48	—14	28.8	1.00	8.5
Ephrata	45	— 8	22.0	2.44	24.5
Everett	50	—16	20.8	1.88	15.5
Forks of Neshaminy				3.02	
Franklin	50	—16	22.6	1.63	9.0
Freeport	50	—15	25.4	1.30	8.7
George School	47	— 6	23.0	2.57	21.2
Gettysburg	48	— 8	23.9	2.53	21.8
Girardville				2.66	24.8
Gordon	46	—14	20.2	3.34	24.0
Greensboro				1.84	10.5
Greenville	47	—10	22.8	1.62	10.0
Grove City	56	—17	22.4	1.02	7.5
Hamburg	43	— 3	22.6	2.22	
Hanover	50	0	27.2	2.95	27.5
Herrs Island Dam				1.19	4.0
Huntingdon	46	—13	23.6	1.43	13.0
Hyndman	48	—19	25.8	2.30	19.5
Indiana	50	— 9	24.4	1.45	14.5
Irwin	51	—10	27.8	1.65	9.4
Johnstown	54	— 9	26.1	2.46	14.7
Kennett	46	— 2	24.0	1.75	17.0
Lansdale				2.90	
Lawrenceville	49	—17	19.9	0.90	9.0
Lebanon	44	— 6	23.2	2.50	17.2
Leroy	42	—11	18.2	1.26	11.3
Lewisburg	44	—15	21.4	1.30	13.2
Lockhaven	46	— 7	22.0	1.53	13.5
Lock No. 2				1.27	
Lock No. 4				1.27	3.5
Lycippus	56	— 6	26.5	1.69	11.9
Marion	46	—15	23.4	2.30	22.0
Mauch Chunk				2.20	19.5
Mifflintown	43	—16	21.6	1.72	13.3
Milford	44	—16	18.2	2.57	21.2
Montrose	45	—12	15.8	2.40	24.0
New Germantown	48	— 6	23.2	1.60	16.0
Ottsville				2.66	
Parker				1.54	10.0
Pen Mar				1.47	15.2
Philadelphia	50	8	27.8	2.95	23.5
Pocono Lake	43	—20	14.4	1.68	15.0
Point Pleasant				2.56	
Pottsville				1.86	
Reading	46	— 5	23.5	1.96	19.9
Renovo				1.24	12.0
Saegerstown	48	—19	20.6	1.42	10.0
St. Marys	47	— 9	17.2		
Saltsburg				1.59	12.1
Seisholtzville				2.19	
Selinsgrove	46	—16	21.9	1.50	13.5
Shawmont				2.21	
Skidmore	47	—14	21.8	1.11	8.5
Smiths Corners				1.44	
Somerset	45	—18	22.2	3.26	24.0
South Eaton	48	—12	20.5	1.70	16.0
Springdale				1.35	10.9
Springmount				1.84	
State College	44[b]	— 2[c]	21.2[b]	1.30	9.8
Towanda	47	—13	19.4	1.10	10.3
Uniontown	54	— 5	28.4	3.17	14.2
Warren	49	—10	21.6	0.86	5.9
Wellsboro	43	—15	18.6	0.80	7.9
Westchester	48	1	23.8	2.57	27.8
West Newton				1.74	9.0
Whitehaven	48	— 9	19.0	2.78	
Wilkesbarre	46	— 8	22.0	1.75	17.5
Williamsport	42	— 3	22.4	0.94	10.8
Rhode Island.					
Bristol	40	— 1	22.6	3.86	24.0
Kingston	45	— 9	20.3	3.75	30.0
Pawtucket	42	— 4	24.2	3.66	26.2
Providence	47	— 1	22.4	4.22	35.5
South Carolina.					
Aiken	70	22	47.6	4.20	T.
Allendale				3.95	
Anderson	67	18	44.6	3.38	0.8
Batesburg	84	19	45.7	5.31	T.
Beaufort	78	27	52.0	2.17	
Bennettsville	71	18	44.4	4.43	1.2
Blackville	74	25	49.1	4.41	
Blairs				4.22	
Bowman	72	24	47.4	2.21	
Calhoun Falls				3.86	
Camden	88	18	43.9	4.27	0.5
Catawba				2.84	
Chappells				4.38	
Cheraw	69	19	41.4	4.66	2.0
Clarks Hill	74	22	46.0	4.90	T.
Clemson College	64	22	43.5	3.62	
Conway	76	21	45.4	3.10	T.
Darlington	71[d]	19[d]	43.4[d]	4.24	1.0
Dillon	72	16	44.0	4.62	3.0
Due West	65	22	45.5	4.09	
Edisto				4.64	
Effingham				4.50	1.0
Florence	71	21	44.2	3.43	
Georgetown	73	23	48.6	1.90	
Greenville	65	17	39.4	2.23	0.5
Greenwood	66	22	42.6	3.72	
Heath Springs	68	19	42.8	3.86	
Kingstree	71	25	50.6	2.42	
Liberty	66	20	43.8	3.32	1.0
Little Mountain	72	21	45.0	4.05	
Newberry	68	22	44.0	4.24	
Pelzer				3.06	1.5
Pinopolis[e1]	70	26	49.6	3.92	
St. George	69	25	50.5	3.06	
St. Matthews	70	23	46.3	5.33	T.
St. Stephens				2.64	
Saluda	69	21	45.4	4.76	
Santuck	65	20	42.8	4.07	1.2
Smiths Mills				3.63	
Society Hill	67	20	42.8	5.69	6.5
Spartanburg	70	20	41.6	2.89	0.5
Stateburg	71	22	46.6	5.93	1.5
Summerville	73	25	49.6	2.11	
Trenton	67	22	45.5	4.26	
Trial	75	25	47.4	3.14	
Walhalla	70	23	45.2	3.89	
Walterboro	77	25	50.8	2.55	
Winnsboro	68	21	44.7	4.65	
Winthrop College	62	18	42.8	4.26	T.
Yemassee	74	24	49.0	2.10	
Yorkville	68	20	43.6	3.52	1.0
South Dakota.					
Aberdeen	48	—36	13.8	0.76	7.6
Academy	64	—21	25.2	0.60	6.0
Alexandria	65	—22	23.0	0.20	2.0
Armour	65	—28	23.8	0.60	6.0
Ashcroft	57	—28	23.4	0.30	3.0
Bowdle	40	—27	15.2	1.20	12.0
Brookings	56	—33	19.1	0.28	2.8
Canton	59	—26	23.4	0.31	3.1
Castlewood	52	—34	16.7	0.44	4.3
Centerville	61	—25	23.8	0.65	6.5
Chamberlain	70	—19	24.4	0.42	5.0
Cherry Creek	55	—17	23.6	0.53	
Clark	47	—34	15.9	0.44	4.4
Clear Lake	48	—28	16.7	0.56	5.6
Desmet	55	—29	19.2	0.45	4.5
Elkpoint	64	—25	25.0	1.12	11.2
Fairfax	61	—21	27.0	1.07	4.0
Faulkton	49	—27	17.0	0.80	8.0
Flandreau	53	—26	19.4	0.32	3.2
Forestburg	61	—22	19.4	0.44	4.4
Fort Meade	64	—22	31.3	0.40	4.0
Frederick	44	—37	14.6	0.68	7.0
Gannvalley	60	—17	21.2	0.30	3.0
Greenwood	69	—24	27.8	1.06	10.5
Gregory	60	—27	25.2	0.30	3.0
Hermosa	64	—24	28.4	0.69	7.0
Highmore	60	—22	20.0	0.40	4.0
Howard	56	—22	20.2	0.30	3.0
Howell	57	—30	17.3	0.45	4.8
Ipswich	41	—36	14.8	0.60	6.2
Kennebec	64	—20	23.8		
Kidder	55	—33	15.4	0.15	1.5
Kimball	61	—17	22.1	0.30	3.0
La Delle	51	—27	18.0	0.68	7.8
Leola	40	—31	15.8	0.60	6.0
Marion	70	—20	26.0	0.73	6.3
Mellette	57	—34	17.2	0.30	3.0
Menno	64	—25	24.0	0.48	5.0
Milbank	59	—35	16.2		
Mitchell	67	—24	21.1	0.44	
Mound City	48	—29	15.6	0.40	4.0
Oelrichs	65	—19	27.4	0.70	7.0
Orman	61	—19	27.0	0.48	5.0
Pine Ridge	63	—15	32.0	1.01	10.1
Plankinton				0.65	6.5
Redfield	57	—31	16.2	0.40	4.0
Roslyn	44	—31	14.6	0.58	6.7
Sioux Falls	59	—25	23.1	0.21	
Spearfish	63	—20	31.9	0.38	2.9
Stephan	62	—22	19.8	0.37	3.5
Tyndall	67	—25	28.4	0.15	1.5
Vermillion	68	—23	28.6	0.90	9.0
Warnecke	45	—22	17.3	0.15	1.5
Watertown	48	—29	15.3	0.93	9.3
Wentworth	56	—26	19.6	0.29	2.9
Whitehorse	55	—24	19.6	1.02	10.2
Woolsey				0.26	3.0
Tennessee.					
Ashwood	70	8	40.8	3.05	2.5
Benton	70	19	42.6	4.52	T.
Birds Bridge				2.08	
Bluff City				2.79	1.0
Bolivar	70	14	42.2	4.16	3.0
Bristol	60	13	36.6	2.20	4.0
Brownsville	67	12	40.6	3.74	2.5
Byrdstown	68	12	38.8	4.93	7.9
Carthage				4.84	0.5
Cedar Hill	74	0	39.9	4.95	6.5
Celina				4.39	
Charleston				4.80	T.
Clarksville	70	— 1	39.4	5.48	8.4
Clinton				5.15	3.0
Covington	68[e]	14[d]	40.4[e]		
Dandridge				3.01	1.3
Decatur	70	18	41.4	4.57	1.0
Dickson	72	5	41.4	4.35	1.2
Dover	74	— 5	40.6	6.15	5.5
Dyersburg	71	7	40.1	5.08	2.5
Elizabethton	62	13	38.2	2.34	7.5
Florence	70	9	40.8	3.15	1.5
Franklin	70	5	40.0	4.14	4.0
Halls Hill				3.43	
Harriman	65	17	39.6	3.84	T.
Hohenwald	71	5	40.1	4.17	2.5
Iron City	71	13	42.5	4.70	4.0
Jackson	72	12	44.0	4.32	4.0
Johnsonville	72	— 1	42.0	4.41	5.5
Jonesboro	65	14	39.5	1.97	0.8
Kenton	70	2	41.4	5.68	7.3
Kingston				3.67	T.
Lafayette	73	3	38.3	5.07	9.0
Lewisburg	72	11	41.1	3.49	2.0
Loudon				4.50	T.
Lynnville	67	12	41.0	3.17	2.5
McGee				3.87	1.4
McMinnville	71	10	41.3	3.58	1.7
Maryville	70	17	41.5	3.99	0.5
Newport	69	19	40.6	2.82	1.0
Palmetto	73	9	41.9	3.35	T.
Pinewood	72	2[d]	41.4[e]	3.70	4.0
Pope	72	9	41.6	4.44	2.0
Rogersville	66	11	39.0	3.14	2.0
Rugby	69	4	35.4	5.16	5.5
Savannah	70	14	44.0	3.58	5.0
Sevierville	71	18	40.8	2.97	0.8
Sewanee	68	11	40.2	3.40	2.5
Silver Lake	59	9	34.8	3.39	7.5
Sparta	70	12	40.2	3.56	0.2
Springdale	66	8	39.3	5.68	3.0
Springville	72	— 8	40.0	5.06	3.8
Tazewell				4.32	2.5
Tellico Plains	73	18	43.2	4.11	T.
Tracy City	66	12	39.0	5.24	
Trenton	70	— 1	41.4	5.74	4.0
Tullahoma	69	12	41.4	3.71	0.6
Union City	70	3	41.4	5.58	.6.8
Walling				3.48	
Watertown	71	10	41.6	3.10	2.0
Waynesboro	71	11	41.6	3.93	4.8
Wildersville	68	11	42.2	4.20	2.2
Yukon	69	13	42.4	3.97	
Texas.					
Albany	85	14	50.9	0.00	
Alvin				1.37	
Arthur				1.46	
Austin	77	26	56.4	0.22	
Ballinger	90	10	54.4	T.	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Barstow	82	22	48.8	0.00	
Beaumont				1.96	
Beeville	88	31	59.4	1.39	
Big Springs	78	16	51.0	0.00	
Blanco	75	24	47.8	0.03	
Boerne	88	22	55.2	1.00	
Bonham	82[e]	20[e]	51.0[e]	2.55	
Booth				1.70	
Bovina				0.00	
Bowie	82	16	51.1	0.73	T.
Brenham	84	30	55.2	5.24	
Brighton	79	32	60.4	1.65	
Canadian	73	10	45.5	T.	T.
Channing				T.	T.
Childress	80	10	47.6	0.00	
Clarksville	82	23	49.6	1.52	T.
Claude	73	11	43.0	0.00	
Coleman	84	17	54.8	T.	
College	77	30	55.1	2.65	
Colorado	84	13	50.8		
Columbus				3.43	
Corsicana	80	26	53.3	2.19	
Crockett	82	27	56.6	3.41	
Cuero	87	32	63.8	1.41	
Dallas	85	22	51.2	1.52	
Dalhart			T.	T.	
Danevang	82	28	59.5	5.67	
Decatur	87	19	49.0	0.12	
Denison				1.20	
Dialville	79	28	55.0	1.82	
Duval	84	25	57.6	0.39	
Eagle Pass	92	28	60.4	0.08	
Fort Clark	83	29	59.6	0.00	
Fort McIntosh	98	32	63.7	0.00	
Fredericksburg	80	22	52.2	0.13	T.
Gatesville	83	23	53.8	1.15	
Georgetown	84	25	56.6	0.52	
Gonzales				2.19	
Graham	85	14	49.4	T.	
Grapevine	83	21	53.8	2.33	2.5
Greenville	81	23	51.6	2.17	
Hallettsville	82	30	58.9	1.96	
Haskell	85	14	50.2	0.00	
Hebbronville				0.45	
Hempstead				4.02	
Henrietta	85	8	44.4	0.02	
Hewett				0.56	
Hillsboro	85	23	52.5	1.32	
Hondo	84	30	58.8	0.14	
Houston	86	34	58.6	2.28	
Hubbard	84	26	53.6	0.59	T.
Huntsville	79	29	55.7	3.30	
Jewett	80	25	54.2	2.69	
Kaufman	81	26	53.3	5.20	T.
Keene	82	21	54.0	0.30	
Kent	81	27	56.8	0.00	
Kerrville	81	45	63.1	0.55	
Knickerbocker	86	14	52.8	0.05	
Kopperl				0.26	
Lampasas	85	23	51.6	1.17	
Lapara				0.50	
Laureles Ranch				0.61	
Liberty	84	30	59.6	2.11	
Llano	84	24	55.7	0.70	
Longlake				1.52	
Longview	81	27	51.8	2.67	
Lufkin	81	29	56.6	3.78	
Luling	82	27	57.3	5.04	
McLean	75	7	44.2	0.13	
Mexia	81	22	52.5	2.35	
Miami	75	8	43.6	T.	T.
Mount Blanco	75	12	47.0	T.	T.
Nacogdoches	80	27	53.7	2.84	
Nazareth	78	11	45.6	T.	
New Braunfels	82	27	58.6	0.26	
Ochiltree				0.00	
Orange				1.50	
Panter				0.84	
Paris	87	20	52.5	1.40	
Pierce	82	30	58.4	3.51	
Plemons	76	7	41.5	0.12	
Port Lavaca	80	31	60.0	3.28	
Rhineland	85	12	48.4		
Riverside				1.18	
Rockland	82	33	58.3	1.90	
Rockport	78	34	59.0	2.04	
Sabinal	87	27	58.2	0.05	
San Marcos	82	27	54.9	0.16	
San Saba	85	20	53.5	1.13	
Santa Gertrude				0.00	
Seymour	82	14	48.6	T.	
Sherman	78	21	49.6	1.27	T.
Sulphur Springs	80	25	52.3	1.61	T.
Temple	83	21	53.0	1.47	
Texline				0.00	
Tilden				0.49	
Victoria	84	32	60.2	4.47	
Waco	84	27	54.0	0.83	
Waxahachie	84	23	51.4	0.60	
Weatherford	81	19	50.7	0.61	
Wichita Falls				0.23	
Willis	81	30	59.2	5.09	
Willspoint	78	25	53.8	2.46	T.
Utah.					
Aneth	66	20	44.4	0.41	T.
Beaver	75	17	48.2		
Blackrock	65	20	42.7	0.78	4.0
Castledale	63	8	37.1	0.40	
Cedar City	60	12	42.0	1.31	14.0
Corinne	59	23	39.3	1.36	2.0
Deseret	69	16	41.1	0.82	
Emery	60	20	38.2	0.90	
Enterprise				1.66	2.0
Escalante	62	22	41.3	1.58	14.0
Experiment Farm	73	22	48.2		
Farmington	57	25	41.5	5.26	7.0
Fillmore	74	14	45.6	1.96	
Fort Duchesne	51	5	28.1	T.	T.
Garrison	64	14	42.0	0.55	
Government Creek	57	11	40.4	2.00	8.0
Grantsville				0.84	
Grayson	62	24	42.0	0.55	T.
Green River	86	40	55.8	1.20	3.0
Heber	55	10	35.2	3.96	
Henefer	58	14	36.6	5.12	5.5
Hite	72	29	51.4	0.45	
Huntsville				7.23	7.0
Ibapah	56	7	34.5	1.79	20.6
Kelton				0.66	3.0
La Sal	54	19	38.0	0.45	4.5
Levan	57	11	40.0	2.70	4.5
Loa	52	10	32.0	0.20	2.0
Logan	51	20	37.6	2.69	
Manti	69[d]	18[e]	40.6[d]	2.11	
Marion				2.81	13.0
Marysvale	64	14	40.3	0.53	3.0
Millville				1.63	
Minersville				0.70	5.0
Moab	69	20	46.0	0.56	
Morgan	61	15	39.4	6.15	7.0
Mount Nebo	60	21	41.4	1.09	3.0
Mount Pleasant	57	19	40.0	2.41	
Nephi				2.27	T.
Oak City	64	20	42.6	1.80	
Ogden	56	25	41.2	4.37	4.0
Park City	53	7	31.8	4.45	
Parowan	60	12	39.8	1.58	16.0
Payson				3.18	4.0
Plateau	58	13	36.0	2.32	18.1
Provo	59	24	41.1	3.10	3.0
Ranch	54	7	33.8	2.01	
Richfield	69	7	43.2	0.85	6.0
Rockville	81	37	57.6	1.20	
St. George	75	27	51.4	0.76	
Salt Air	58	28	40.4	2.08	
Scipio	61	14	41.2	2.35	T.
Snowville	59	12	37.4	0.90	
Soldier Summit				1.82	18.2
Sunnyside				1.20	7.0
Theodore	53	10	34.0	0.69	5.0
Thistle	64	18	40.4	2.40	4.0
Tooele	60	21	42.0	1.98	
Tropic	60	15	39.8	0.16	0.8
Trout Creek	67	15	41.4	0.51	8.0
Verdure				0.55	
Vernal	58	12	33.4	0.41	0.5
Woodruff	45	2	27.2	2.00	9.5
Vermont.					
Bloomfield	41	—33	7.8	0.82	17.8
Chelsea	40	—17	9.0	1.27	17.0
Cornwall	40	—15	13.5	0.85	12.5
Enosburg Falls	45	—24	10.2	0.91	12.7
Jacksonville	44	—31	12.8	1.19	32.0
Manchester	42	—14	13.1	0.75	12.2
Norwich	43	—25	11.2	1.40	14.5
St. Johnsbury	41	—28	9.2	1.24	11.8
Wells	38	—18	10.3	1.08	16.0
Westfield				1.03	
Woodstock	42	—30	8.6	0.79	17.0
Virginia.					
Arvonia	67	— 6	34.8	2.18	8.8
Ashland	62	9	32.9	1.57	7.8
Barboursville	63[e]	— 4[e]	33.8[e]		
Bigstone Gap	63	11	37.4	4.56	7.0
Blacksburg	65	— 1	31.4	2.02	7.2
Buchanan				2.04	10.0
Burkes Garden	54	1	30.6	2.32	7.0
Callaville	59	12	35.5	3.47	2.5
Charlottesville	63	6	33.0	1.89	10.0
Clarksville				3.33	16.4
Columbia	64	1	34.2	1.31	5.8
Dale Enterprise	60	—16	30.0	1.77	15.0
Danville				2.49	4.0
Dinwidde	65	10	35.0	4.03	9.2
Doswell	66	7	34.7	1.73	6.8
Elk Knob	59	8	36.1	4.09	5.5
Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fredericksburg	62	2	32.4	2.77	8.0
Grahams Forge	65	0	34.6	1.33	6.4
Hampton	64	17	37.4	3.82	3.0
Hot Springs	59	— 5	29.4	1.53	9.9
Ivanhoe				1.72	6.4
Lexington	65	— 3	33.2	1.70	10.8
Lincoln	57	—10	26.1	2.06	14.5
Marion	62	8	35.4	1.67	7.0
Mendota				2.42	4.0
Newport News	61	15	36.4	4.52	4.2
Nokesville (near)	55	8	29.6	1.65	16.5
Petersburg				2.95	7.2
Quantico	59	4	31.0	2.23	12.5
Radford				1.98	10.0
Randolph				0.84	12.0
Riverton				1.38	14.0
Rockymount	67	10	36.2	2.11	7.0
Shenandoah				1.47	11.3
Speers Ferry				3.29	7.2
Spottsville	62	15	36.0	3.92	5.2
Staunton	63	— 7	34.0	2.41	15.7
Stephens City	60	—14	28.8	1.54	17.0
Warsaw	61	10	33.1	2.16	5.5
Williamsburg	60	14	36.6	4.25	8.5
Woodstock	63	—12	30.7	1.99	13.8
Washington.					
Aberdeen	60	30	43.8	9.08	1.5
Anacortes	53	23	41.0	4.46	1.5
Ashford				6.77	13.0
Baker	58	20	38.0	7.84	2.5
Bellingham	55	20	40.6	5.65	2.0
Bogachiel	58	26	43.6	19.56	4.0
Cedar River				6.28	3.6
Centralia	62	21	42.8	4.45	1.5
Cheney	60	5	34.6	0.70	7.0
Clearbrook	50	12	35.4	7.92	1.0
Clearwater	56	29	44.0	21.67	3.0
Cle Elum	53	11	32.4	3.45	24.0
Colville	52	1	30.8	1.33	2.5
Conconully	48	— 4	25.2	0.55	5.0
Coupeville	57	24	42.0	2.25	4.5
Crescent	51	2	30.1	1.66	6.0
Easton				4.10	32.0
East Sound	53	20	39.1	5.65	
Ellensburg	54	8	31.6	1.33	12.7
Ephrata	56	5	32.1	0.30	3.0
Fort Simcoe	63	15	38.6	1.85	14.0
Goldendale	55	12	37.2	2.30	12.0
Hatton	58	12	34.0	1.36	9.5
Kennewick	60	12	37.1	0.98	5.8
Kiona	62	16	37.6	0.64	5.0
Kosmos	66	28	42.2	7.94	11.5
Lacenter	62	24	41.8	4.72	5.5
Lakeside	48	9	30.2	0.81	9.5
Lester	66	18	40.1	7.65	3.5
Loomis	55	4	32.8	0.04	0.4
Lovings Ranch	66	32	46.6	9.47	
Lucerne	54	18	34.9	2.42	13.6
Merritt				7.80	24.0
Mottinger Ranch	63	19	38.7	1.32	5.0
Mount Pleasant	60	22	42.4	4.95	T.
Moxee	57	8	34.6	0.62	5.7
Northport	47	— 6	27.8	1.32	5.2
Olga	56	26	42.6	5.04	1.0
Olympia	58	29	42.4	5.43	7.0
Pinehill	58	20	38.3	4.89	22.7
Pomeroy	51	20	34.8	1.85	16.0
Port Townsend	57	26	42.3	1.67	4.0
Pullman	58	3	35.0	1.52	9.0
Quiniault	57	28	42.8	20.83	0.5
Rex Creek	57	15	35.0	2.36	14.0
Ritzville				2.27	10.4
Rock Lake				0.00	
Rosalia	54	7	32.7	1.69	5.2
Ruby Hill	52	— 6	26.8	0.77	5.2
Sedro	57	23	40.3	6.57	1.5
Sixprong	62	11	36.9	1.30	4.0
Snohomish	55	20	40.1	4.41	7.0
Snoqualmie	60	24	40.8	7.51	
Stehekin	63	8	33.4	2.98	21.9
Stokes	54	3	29.1	1.05	10.0
Touchet	61	11	38.6	1.25	7.5
Twisp	50	— 5	23.8	0.76	8.1
Union	60[d]	26[e]	41.5[d]	16.49	6.0
Vancouver	63	25	44.0	4.67	4.8
Vashon	55	30	42.0	5.37	3.0
Wahluke	55	15	35.3	0.94	7.5
Waterville	48	— 1	26.7	1.00	10.0
Wenatchee (near)	53	5	31.4	1.43	12.0
Wilbur	48	2	28.3	0.68	7.0
Yale	65	27	43.8	9.84	4.5
Zindel	64	22	41.4	0.48	0.7
West Virginia.					
Bancroft	65	0	32.2	3.01	6.0
Bayard	53	—23	25.0	4.17	27.0
Beckley	63	— 9	31.8	1.05	10.5
Bens Run	58	— 3	30.6	2.88	15.0
Berkley Springs	52	5	28.2	2.31	23.1

TABLE II.—*Climatological record of cooperative observers*—Continued. *Late reports for January, 1907.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
West Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bluefield	59	4	32.8	3.25	.....
Burlington	52	—18	27.6	1.90	19.0
Cairo	63	—14	32.4	3.39	11.0
Central	58	—16	29.8	1.77	8.0
Charleston	66	5	38.6	4.31	12.0
Creston	57	— 9	31.4	2.19	8.0
Cuba	61	—19	31.4	1.96	7.5
Davis	.....	.....	.....	3.83	7.3
Elkhorn	63	10	35.6	3.44	6.5
Fairmont	57	—12	30.8	3.53	10.0
Franklin	62	—13	31.5	1.33	10.0
Glenville	63	—10	33.4	2.30	8.5
Grafton	58	—10	30.8	2.98	11.0
Green Sulphur Springs	65	0	33.4	1.60	10.0
Harpers Ferry	.....	.....	.....	2.54	15.0
Hinton	63[c]	7[c]	34.8[c]	3.04	12.0
Huntington	63	0	31.3	2.76	6.1
Leonard	55	3	29.0	.....	.....
Lewisburg	60	— 6	30.8	2.77	14.8
Lost City	58	— 6	31.9	1.30	10.0
Lost Creek	60	—18	31.2	2.73	6.5
Madison	66	— 4	33.0	3.75	13.1
Mannington	56	—18	29.9	2.70	11.9
Martinsburg	50	—10	24.1	1.90	17.0
Moorefield	67	—18	30.6	1.20	12.5
Mooresville	.....	.....	.....	2.56	10.5
Morgantown	57	— 6	29.4	2.24	9.0
Moundsville	55	— 5	30.8	1.24	6.8
Mount Pleasant	.....	.....	.....	2.43	6.0
New Cumberland	59	— 9	25.5	0.67	6.0
New Martinsville	56	— 6	31.4	1.92	7.0
Nuttallburg	.....	.....	.....	2.30	15.0
Oceana	62	2	37.8	3.44	7.0
Parsons	59	—18	28.8	4.16	12.0
Philippi	59	—21	30.8	3.07	11.5
Pickens	53	—10	27.1	4.83	19.0
Point Pleasant	63	— 3	34.2	2.43	6.0
Powellton	66	3	35.6	3.18	16.1
Princeton	58	3	31.1	4.80	16.5
Romney	59	—11	27.8	1.51	15.0
Rowlesburg	.....	.....	.....	3.87	12.5
Ryan	62	—15	33.2	2.68	9.7
Smithfield	54	—15	28.0	2.25	11.8
Southside	66	—10	33.0	2.11	6.5
Spencer	62	—18	28.6	1.99	10.5
Sutton	65	— 7	32.8	2.02	10.0
Terra Alta	50	—11	24.6	4.16	21.2
Union	56	5	29.2	4.09	13.5
Uppertract	62	—14	30.6	1.04	8.8
Webster Springs	63	0	34.4	2.20	13.2
Wellsburg	51	0	26.1	1.28	10.1
Weston	62	—10	29.0	3.25	10.6
Wheeling	58	15	36.2	0.78	7.0
Williamson	67	10	38.1	3.37	8.0
Wisconsin.					
Amherst	45	—29	18.5	0.30	3.0
Appleton	45	—14	20.4	0.66	0.9
Appleton Marsh	46	—30	18.0	0.21	1.6
Antigo	45	—27	16.4	0.20	2.0
Ashland	46	—24	15.8	0.73	8.0
Barron	46	—40	13.4	1.05	10.5
Beloit	.....	.....	.....	0.54	6.0
Brodhead	50	—22	22.2	0.40	4.0
Burnett	45	—22	19.8	0.38	0.2
Butternut	47	—42	13.7	0.70	7.0
Chilton	44	—16	19.8	0.41	2.2
Chippewa Falls	.....	.....	.....	0.70	8.0
Dodgevill	43	—13	22.8	0.10	1.0
Downing	49	—47	11.0	1.60	16.0
Eau Claire	47	—33	16.6	0.75	7.5
Florence	45	—31	12.4	1.37	13.0
Fond du Lac	47	—18	29.8	0.25	1.5
Grand Rapids	47	—30	18.4	0.19	2.5
Grand River Locks	.....	.....	.....	0.42	3.0
Grantsburg	45	—44	14.6	0.90	9.0
Hancock	44	—28	17.8	0.66	.....
Hayward	50	—50	13.2	0.75	7.5
Hillsboro	49	—35	18.0	0.20	1.0
Koepenick	49	—36	16.2	0.80	8.0
Lake Mills	48	—13	21.2	0.14	1.8
Lancaster	49	—14	22.2	0.72	5.5
Manitowoc	43	—12	21.2	0.41	1.5
Mauston	47	—27	19.8	0.18	1.0
Meadow Valley	48	—30	17.9	0.21	2.5
Medford	48	—29	17.2	0.20	2.0
Menasha	.....	.....	.....	0.17	1.5
Merrill	47	—42	14.9	0.34	3.0
Minocqua	44	—41	13.6	0.80	8.0
Mount Horeb	56	—14	21.9	0.32	3.0
Neillsville	48	—34	16.4	1.00	8.0
New London	46	—22	19.5	0.16	1.0
New Richmond	49	—36	17.0	0.90	9.0
Oconto	48	—23	18.8	0.30	3.0
Osceola	49	—43	14.4	0.53	7.5
Oshkosh	48	—18	19.8	0.27	2.0
Pine River	47	—20	19.7	0.13	1.3
Portage	49	—25	20.8	0.19	1.0
Port Washington	46	—11	21.8	0.60	2.0
Wisconsin—Cont'd.	°	°	°	*Ins.*	*Ins.*
Prairie du Chien	53	—22	22.6	0.35	4.0
Prentice	43	—44	14.8	0.27	3.5
Racine	51	— 9	24.2	0.57	4.3
Sheboygan	45	—11	23.0	1.14	2.0
Shullsburg	50	—13	21.5	0.27	5.0
Solon Springs	45	—50	12.0	0.45	4.5
Spooner	43	—39	13.6	0.76	8.3
Stanley	44	—31	15.6	0.70	7.0
Stevens Point	46	—38	16.9	0.08	1.0
Sturgeon Bay	44	—20	18.4	0.88	13.0
Valley Junction	47	—30	17.8	0.39	2.2
Viroqua	47	—19	20.0	0.28	3.0
Watertown	47	—14	19.6	0.59	1.8
Waukesha	.....	.....	.....	0.11	0.9
Waupaca	49	—26	19.6	0.18	1.8
Wausau	45	—28	17.4	0.18	3.8
Weyerhauser	44	—40	14.0	1.64	7.5
Whitehall	46	—31	16.8	0.40	4.0
Wyoming.					
Afton	47	— 8	27.2	2.95	19.0
Barnum	.....	.....	.....	0.40	4.0
Barret Creek	52[d]	— 6[d]	25.9[d]	2.47	24.0
Basin	57	—15	27.5	0.14	3.0
Bedford	45	— 6	26.4	2.01	19.7
Blue Cap	46	—14	25.2	0.90	9.0
Border	49	—12	22.6	3.61	.....
Buffalo	60	—18	31.0	0.24	2.3
Camp Colter	60	—16	24.0	0.13	1.9
Chugwater	60	—10	33.4	1.13	10.5
Clark	61	—18	34.2	6.78	14.5
Clear Creek Cabin	59	—17	26.8	1.07	13.0
Cody	60	—18	32.5	0.40	4.0
Daniel	40	—26	15.4	4.70	50.0
Dubois	.....	.....	.....	1.60	16.0
Elk Mountain	.....	.....	.....	1.21	22.5
Embar	58	—20	27.8	0.29	2.0
Evanston	51	— 1	30.2	1.76	13.0
Experiment Farm	.....	.....	.....	0.10	3.0
Fontenelle	44	—14	19.5	2.30	23.0
Fort Laramie	64	— 9	33.6	0.88	9.5
Fort Washakie	59	—12	33.6	.....	.....
Granite Canyon	57	—10	33.8	0.94	8.0
Granite Springs	60	— 5	35.8	0.53	9.0
Green River	49	2	28.8	0.58	8.0
Griggs	68	—22	26.8	0.35	3.0
Hatton	.....	.....	.....	1.15	11.5
Hyattville	62	—18	31.8	.....	.....
Jackson	45	—20	21.0	1.67	14.5
Kirtley	57	—17	30.4	0.55	8.0
Laramie	55	1	32.8	0.15	1.6
Leo	46	—12	30.8	0.66	5.8
Little Medicine	44	— 7	24.6	0.96	12.0
Lolabama Ranch	51	—21	29.2	0.65	6.5
Lusk	65	—15	31.7	0.45	3.0
Moorcroft	58	—30	27.3	0.30	3.0
Moore	55	—11	34.0	1.09	16.0
New Castle	56	—16	30.1	0.70	7.0
Pathfinder	52	—11	33.4	0.56	11.0
Phillips	65	—11	35.4	1.20	11.0
Pine Bluff	70	—10	36.4	0.40	4.0
Pinedale	47	—12	19.0	1.56	20.5
Rawlins	48	2	31.8	0.44	5.2
Riverton	62[e]	— 8	31.7[e]	T.	T.
Saratoga	54	9	34.2	0.20	2.5
Sheridan	60	—25	30.1	1.20	12.0
Shoshone Canyon	60	—18	35.0	1.02	8.8
South Pass City	37	— 5	17.4	3.00	30.0
Wells	35	—21	13.5	1.83	25.0
Wheatland	65	—10	34.5	1.15	17.0
Wolf	64	—18	34.9	0.20	2.0
Worland	61	—23	24.8	0.10	1.0
Wyncote	66	—10	35.2	0.57	10.0
Yellowstone Pk. (Lake)	44	—10	23.2	1.51	13.0
Yellowstone Pk. (Norris)	50	—10	24.4	0.50	5.0
Yellowstone Pk (Riv'side)	45	—14	24.6	0.42	6.0
Yellowstone Pk (Snake R)	45	—16	21.1	0.12	3.0
Yellowstone Pk (Soda B)	50	—10	26.1	0.30	2.0
Yellowstone Pk. (T. Sta.)	45	— 9	22.8	0.10	0.4
Yellowstone Pk. (Up. Ba.)	50	—12	22.3	0.37	3.0
Porto Rico.					
Adjuntas	79	55	67.3	2.62	
Aguirre	93	48	72.0	0.52	
Albonita	83	46	67.5	2.28	
Alto de La Bandera	80	63	71.0	7.33	
Anasco	91	50	74.0	3.66	
Arecibo	88	52	69.5	7.20	
Barros	80	48	66.7	4.62	
Bayamon	87	53	70.4	5.66	
Caguas	86	48	69.2	5.12	
Canovanas	85	62	74.4	3.47	
Cayey	83	44	65.8	4.06	
Cidra	91	48	68.4	3.76	
Carozal	89	53	72.0	6.96	
Fajardo	86	59	74.2	3.09	
Guanica	90	55	73.8	1.31	
Guayama	.....	.....	.....	0.73	
Hacienda Colosa	85	53	70.8	4.91	
Humacao	82	56	71.6	0.29	
Porto Rico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Isabel	88	61	74.3	4.15	
Isolina	.....	.....	.....	8.55	
Juana Diaz	87	59	73.5	3.07	
La Carmelita	89	54	69.5	6.25	
Lares	84	51	68.6	5.53	
Las Marias	85	55	69.5	4.61	
Manati	89	57	72.8	7.28	
Maunabo	88	60	75.8	2.08	
Mayaguez	90	55	72.6	2.07	
Morovis	89	54	71.5	9.13	
Ponce	88	60	74.2	1.58	
Rio Piedras	.....	.....	.....	3.16	
San German	85	53	70.8	3.47	
San Lorenzo	88	47	68.6	3.38	
San Salvador	81	55	67.2	5.33	
Santa Isabel	87[c]	54[c]	73.4[c]	2.27	
Vieques	86	67	75.2	1.58	
Yabucoa	.....	.....	.....	2.31	
Yauco	86	54	71.5	1.85	
New Brunswick.					
St. John	39	—11	13.8	4.10	

Late reports for January, 1907.

Alaska.	°	°	°	*Ins.*	*Ins.*
Circle City	36	—50	—3.3	1.02	8.5
Coal Harbor	44	23	35.4	5.65	3.5
Copper Center	39	—50	—14.2	.....	.....
Dutch Harbor	47	25	37.6	8.76	
Fairbanks	34	—53	—3.3	3.39	33.0
Fort Egbert	36	—53	—9.8	1.45	20.0
Fort Gibbon	35	—57	—1.8	1.26	12.6
Fort Liscum	44	2	20.8	1.75	17.5
Holy Cross Mission	36	—19	10.0	2.08	15.5
Kenai	34	—29	7.8	0.68	5.0
Ketchemstock	33	—50	—15.7	0.12	2.0
Nome	33	—24	12.0	2.64	25.2
North Fork	36	—66	—17.0	0.69	15.5
Orca	38	10	25.7	3.26	3.0
Rampart	38	—59	—6.8	1.17	12.0
St. Michael	35	—12	14.0	0.60	6.0
Summit	30[f]	45[f]	00.0[f]	1.80	18.0
Sunrise	36	—13	10.2	2.05	7.5
Teikhill	35	—32	—3.4	0.37	4.5
California.					
Bowmans	.....	.....	.....	13.82	143.0
Henninger	70	22	44.9	13.96	.....
Imperial	79	26	52.0	0.25	
Nellie	.....	.....	.....	15.22	28.0
Snedden	.....	.....	.....	13.50	60.0
Ventura	74	30	53.3	14.01	
Colorado.					
Blaine	70	7	34.6	0.02	T.
Pagoda	56	2	28.9	1.14	18.0
Florida.					
Plant City	85	40	64.0	0.28	
Indian Territory.					
South McAlester	80	17	48.4	0.66	T.
Iowa.					
Boone	47	—13	16.8	1.42	2.3
Knoxville	48	— 4	23.3	2.61	7.5
Kansas.					
Goodland	.....	.....	.....	0.40	4.0
Mount Hope	.....	.....	.....	2.78	
Maine.					
Greenville	40	—36	7.4	0.98	.....
Mayfield	40	—22	13.8	1.40	12.0
Oquossoc	37	—45	9.5	1.95	22.5
Michigan.					
Grand Marais	35	—11	15.4	4.84	70.0
Minnesota.					
Winnibigoshish	35	—35	—2.8	1.34	17.8
Missouri.					
New Palestine	73	10	37.6	5.10	2.2
Olden	75	— 3	43.6	3.39	1.1
Montana.					
Jordan	40	—41	1.5	0.80	8.0
New Hampshire.					
Littleton	49	—26	13.2	1.22	6.5
North Dakota.					
Beach	37	—36	1.0	1.27	9.2
Hurd	40	—28	1.4	0.72	5.5
University	32	—37	—7.6	0.80	8.0
Oregon.					
Prospect	.....	.....	.....	6.84	19.8
Sumpter	45	— 4	17.4	6.50	65.0
South Dakota.					
Greenwood	48	—21	14.4	1.35	12.0
Wisconsin.					
Downing	40	—40	6.6	3.14	18.5
Wyoming.					
Yellowstone Pk. (Thumb)	34	—15	13.3	1.96	50.5

TABLE III.—*Wind resultants, from observations at 8 a. m. and 8 p. m., daily, during the month of February, 1907.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	20	9	11	27	n. 56 w.	19
Portland, Me	23	11	3	31	n. 67 w.	30
Concord, N. H. †	14	5	2	11	n. 45 w.	13
Burlington, Vt. †	8	10	8	11	s. 56 w.	4
Northfield, Vt	24	23	5	9	n. 76 w.	4
Boston, Mass	19	10	4	32	n. 72 w.	29
Nantucket, Mass	24	11	6	29	n. 61 w.	26
Block Island, R. I	28	9	5	27	n. 49 w.	29
Providence, R. I	22	9	5	33	n. 65 w.	31
Hartford, Conn	29	14	7	19	n. 39 w.	19
New Haven, Conn	27	11	10	24	n. 41 w.	21
Middle Atlantic States.						
Albany, N. Y	16	15	5	19	n. 86 w.	14
Binghamton, N. Y. †	12	3	6	12	n. 34 w.	11
New York, N. Y	23	13	6	28	n. 66 w.	24
Harrisburg, Pa	15	13	12	26	n. 82 w.	14
Philadelphia, Pa	30	9	7	23	n. 37 w.	26
Scranton, Pa	21	14	10	22	n. 60 w.	14
Atlantic City, N. J	31	9	5	24	n. 41 w.	29
Cape May, N. J	31	10	7	22	n. 35 w.	26
Baltimore, Md	30	10	10	26	n. 39 w.	26
Washington, D. C	31	11	12	14	n. 6 w.	20
Lynchburg, Va	16	12	15	25	n. 68 w.	11
Mount Weather, Va	25	12	10	26	n. 51 w.	21
Norfolk, Va	31	13	14	12	n. 6 e.	18
Richmond, Va	25	18	13	12	n. 8 e.	7
Wytheville, Va	12	5	13	34	n. 72 w.	22
South Atlantic States.						
Asheville, N. C	30	14	10	16	n. 21 w.	17
Charlotte, N. C	21	16	20	12	n. 58 e.	9
Hatteras, N. C	31	8	19	13	n. 15 e.	24
Raleigh, N. C	26	15	9	17	n. 36 w.	14
Wilmington, N. C	28	15	11	17	n. 25 w.	14
Charleston, S. C	23	15	14	17	n. 21 w.	8
Columbia, S. C	24	12	15	20	n. 23 w.	13
Augusta, Ga	25	12	15	18	n. 13 w.	13
Savannah, Ga	21	14	10	22	n. 60 w.	14
Jacksonville, Fla	18	18	15	17	w.	2
Florida Peninsula.						
Jupiter, Fla	21	16	11	24	n. 69 w.	14
Key West, Fla	24	9	27	7	n. 53 e.	25
Tampa, Fla	21	13	12	22	n. 51 w.	13
Eastern Gulf States.						
Atlanta, Ga	19	11	13	25	n. 56 w	14
Macon, Ga. †	9	7	6	10	n. 63 w.	4
Thomasville, Ga	15	25	11	17	s. 31 w.	12
Pensacola, Fla. †	12	6	4	10	n. 45 w.	8
Anniston, Ala	22	16	14	13	n. 9 e.	6
Birmingham, Ala	22	15	10	23	n. 62 w.	15
Mobile, Ala	21	22	13	12	s. 45 e.	1
Montgomery, Ala	19	16	15	18	n. 45 w.	4
Meridian, Miss	25	11	13	17	n. 16 w.	15
Vicksburg, Miss	20	22	17	10	s. 74 e.	7
New Orleans, La	22	23	10	10	s.	1
Western Gulf States.						
Shreveport, La	20	21	14	11	s. 72 e.	3
Bentonville, Ark. †	9	9	9	5	e.	4
Fort Smith, Ark	13	7	26	18	n. 53 e.	10
Little Rock, Ark	24	12	13	17	n. 18 w.	13
Corpus Christi, Tex	19	22	18	6	s. 76 e.	12
Fort Worth, Tex	23	16	11	17	n. 41 w.	9
Galveston, Tex	18	26	16	6	s. 51 e.	13
Palestine, Tex	24	19	11	16	n. 45 w.	7
San Antonio, Tex	23	18	22	5	n. 74 e.	18
Taylor, Tex. †	13	9	2	11	n. 66 w.	10
Ohio Valley and Tennessee.						
Chattanooga, Tenn	20	16	16	17	n. 14 w.	4
Knoxville, Tenn	23	13	9	23	n. 54 w.	17
Memphis, Tenn	26	16	16	13	n. 17 e.	10
Nashville, Tenn	25	9	20	18	n. 7 e.	16
Lexington, Ky. †	11	8	8	10	n. 34 w.	4
Louisville, Ky	22	14	14	16	n. 14 w.	8
Evansville, Ind. †	11	7	10	7	n. 37 e.	5
Indianapolis, Ind	22	16	18	15	n. 27 e.	7
Cincinnati, Ohio	20	10	20	19	n. 6 e.	10
Columbus, Ohio	20	15	17	18	n. 11 w.	5
Pittsburg, Pa	21	11	11	27	n. 58 w.	19
Parkersburg, W. Va	24	13	10	22	n. 47 w.	16
Elkins, W. Va	20	11	3	26	n. 69 w.	25
Lower Lake Region.						
Buffalo, N. Y	11	15	13	28	s. 75 w.	16
Canton, N. Y. †	9	8	8	11	n. 72 w.	3
Oswego, N. Y	19	20	14	14	s.	1
Rochester, N. Y	9	21	11	28	s. 55 w.	21
Syracuse, N. Y	13	21	10	24	s. 57 w.	17
Erie, Pa	9	18	12	26	s. 57 w.	17
Cleveland, Ohio	16	18	14	22	s. 76 w.	8
Sandusky, Ohio †	6	7	7	12	s. 79 w.	5
Toledo, Ohio	22	9	12	18	n. 25 w.	14
Detroit, Mich	17	12	14	28	n. 70 w.	15
Upper Lake Region.						
Alpena, Mich	21	18	6	25	n. 81 w.	19
Escanaba, Mich	23	18	8	18	n. 63 w.	11
Grand Haven, Mich	19	17	19	14	n. 68 e.	5
Grand Rapids, Mich	17	21	13	15	s. 27 w.	4
Houghton, Mich. †	8	3	14	9	n. 45 e.	7
Marquette, Mich	16	17	7	28	s. 87 w.	21
Port Huron, Mich	18	15	12	22	n. 73 w.	10
Sault Ste. Marie, Mich	17	12	14	26	n. 67 w.	13
Chicago, Ill	15	14	11	30	n. 87 w.	19
Milwaukee, Wis	15	15	7	30	w.	23
Green Bay, Wis	18	21	10	24	s. 78 w.	14
Duluth, Minn	16	6	11	32	n. 65 w.	23

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
North Dakota.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Moorhead, Minn	20	19	9	22	n. 86 w.	13
Bismarck, N. Dak	23	10	12	26	n. 47 w.	19
Devils Lake, N. Dak	12	17	12	29	s. 74 w.	18
Williston, N. Dak.	13	22	14	22	s. 42 w.	12
Upper Mississippi Valley.						
Minneapolis, Minn. *	9	8	6	12	n. 80 w.	6
St. Paul, Minn	18	17	14	21	n. 82 w.	7
La Crosse, Wis. †	11	11	3	8	w.	5
Madison, Wis	17	18	9	25	s. 87 w.	16
Charles City, Iowa	21	15	17	20	n. 27 w.	7
Davenport, Iowa	21	14	13	22	n. 52 w.	11
Des Moines, Iowa	21	18	12	16	n. 53 w.	5
Dubuque, Iowa	18	15	9	23	n. 78 w.	14
Keokuk, Iowa	20	14	15	26	n. 61 w.	12
Cairo, Ill	26	15	17	11	n. 29 e.	12
La Salle, Ill. †	10	3	9	10	n. 8 w.	7
Peoria, Ill	19	18	12	18	n. 80 w.	6
Springfield, Ill	19	12	15	20	n. 36 w.	9
Hannibal, Mo. †	10	9	5	12	n. 82 w.	7
St. Louis, Mo	22	16	18	16	n. 18 e.	6
Missouri Valley.						
Columbia, Mo. *	11	3	8	12	n. 27 w.	9
Kansas City, Mo	16	18	17	20	s. 56 w.	4
Springfield, Mo	20	18	14	14	n.	2
Iola, Kans. †	11	7	8	10	n. 27 w.	4
Topeka, Kans. *	13	4	7	9	n. 13 w.	9
Lincoln, Nebr	22	19	13	15	n. 34 w.	4
Omaha, Nebr	22	17	7	23	n. 73 w.	17
Valentine, Nebr	23	10	8	29	n. 59 w.	25
Sioux City, Iowa †	12	10	4	9	n. 68 w.	5
Pierre, S. Dak	22	8	19	19	n.	14
Huron, S. Dak	26	15	14	17	n. 15 w.	11
Yankton, S. Dak. †	10	4	4	15	n. 61 w.	12
Northern Slope.						
Havre, Mont	16	5	19	28	n. 39 w.	14
Miles City, Mont	23	17	21	8	n. 65 e.	14
Helena, Mont	17	10	2	36	n. 78 w.	35
Kalispell, Mont	6	20	2	37	s. 68 w.	38
Rapid City, S. Dak	18	10	17	23	n. 37 w.	10
Cheyenne, Wyo	27	10	3	28	n. 56 w.	30
Lander, Wyo	17	20	16	15	s. 18 e.	3
Yellowstone Park, Wyo	7	34	6	22	s. 31 w.	31
North Platte, Nebr	22	12	13	20	n. 35 w.	12
Middle Slope.						
Denver, Colo	22	16	11	12	n. 9 w.	6
Pueblo, Colo	24	12	20	16	n. 18 e.	13
Concordia, Kans	21	21	13	14	w.	1
Dodge, Kans	23	13	16	16	n.	10
Wichita, Kans	26	14	18	12	n. 27 e.	13
Oklahoma, Okla	28	20	10	8	n. 14 e.	8
Southern Slope.						
Abilene, Tex	23	22	5	17	n. 85 w.	12
Amarillo, Tex	16	23	13	16	s. 23 w.	8
Del Rio, Tex †	8	2	12	11	n. 9 e.	6
Roswell, N. Mex.	20	17	13	15	n. 34 w.	4
Southern Plateau.						
El Paso, Tex	18	6	14	31	n. 55 w.	21
Santa Fe, N. Mex	30	11	17	15	n. 6 e.	19
Flagstaff, Ariz	13	11	20	21	n. 27 w.	2
Phoenix, Ariz	11	9	31	15	n. 83 e.	16
Yuma, Ariz	32	5	14	13	n. 2 e.	27
Independence, Cal	22	17	10	20	n. 63 w.	11
Middle Plateau.						
Reno, Nev	5	13	9	38	s. 75 w.	30
Tonopah, Nev	7	20	21	22	s. 4 w.	13
Winnemucca, Nev	15	13	17	27	n. 79 w.	10
Modena, Utah	9	12	9	34	s. 83 w.	25
Salt Lake City, Utah	14	22	14	20	s. 37 w.	10
Durango, Colo	21	11	2	35	n. 73 w.	34
Grand Junction, Colo	14	16	25	16	s. 77 e.	9
Northern Plateau.						
Baker City, Oreg	9	29	15	14	s. 3 e.	20
Boise, Idaho	21	19	15	16	n. 27 w.	2
Lewiston, Idaho †	1	5	19	7	s. 72 e.	13
Pocatello, Idaho	4	27	15	25	s. 23 w.	25
Spokane, Wash	14	20	14	18	s. 34 w.	7
Walla Walla, Wash	7	34	7	17	s. 20 w.	29
North Pacific Coast Region.						
North Head, Wash	13	20	20	16	s. 30 e.	8
Port Crescent, Wash. *	11	5	12	7	n. 40 e.	8
Seattle, Wash	22	20	12	8	n. 63 e.	4
Tacoma, Wash	23	19	14	14	n.	4
Tatoosh Island, Wash	3	20	26	12	s. 39 e.	22
Portland, Oreg	13	21	23	13	s. 51 e.	13
Roseburg, Oreg	14	20	14	21	s. 49 w.	9
Middle Pacific Coast Region.						
Eureka, Cal	15	22	12	20	s. 49 w.	11
Mount Tamalpais, Cal	18	13	12	23	n. 66 w.	12
Red Bluff, Cal	18	23	18	13	s. 45 e.	7
Sacramento, Cal	14	29	19	7	s. 39 e.	19
San Francisco, Cal	22	11	2	29	n. 68 w.	29
San Jose, Cal. †	12	7	5	11	n. 50 w.	8
Southeast Farallon, Cal. *	12	10	1	15	n. 82 w.	14
South Pacific Coast Region.						
Fresno, Cal	21	13	13	22	n. 48 w.	12
Los Angeles, Cal	17	9	23	19	n. 27 e.	9
San Diego, Cal	24	6	16	21	n. 40 w.	23
San Luis Obispo, Cal	36	6	8	18	n. 18 w.	32
West Indies						
San Juan, Porto Rico	6	18	41	3	s. 72 e.	40
Grand Turk, W. I. †	4	7	22	2	s. 81 e.	20

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.80 in 1 hour, during February, 1907, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Abilene, Tex				0														0			
Albany, N. Y	5			0.72														*			
Alpena, Mich	18–19			0.11														*			
Amarillo, Tex	27			0.24														*			
Anniston, Ala	31b–1			3.44														0.65			
Asheville, N. C	4			0.35														0.10			
Atlanta, Ga	4			2.01														0.44			
Atlantic City, N. J	24			0.52														0.16			
Augusta, Ga	4			1.66														0.47			
Baltimore, Md	4–5			0.78														*			
Bentonville, Ark	25			0.50														0.21			
Binghamton, N. Y	46			0.69														*			
Birmingham, Ala	24			0.74														0.37			
Bismarck, N. Dak	26–27			0.22														*			
Block Island, R. I	1–2			0.87														*			
Boise, Idaho	4–5			1.37																	0.20
Boston, Mass	4–6			0.98														*			
Buffalo, N. Y	19			0.28														*			
Cairo, Ill	23–24			2.86														0.25			
Canton, N. Y	19			0.17														*			
Charles City, Iowa	27–28			0.55														*			
Charleston, S. C	4			0.41														0.27			
Charlotte, N. C	19–20			1.01														0.22			
Chattanooga, Tenn	31b–1			1.84														0.30			
Cheyenne, Wyo	1–3			0.40														*			
Chicago, Ill	4–5			0.73														*			
Cincinnati, Ohio	3–4			0.30														0.06			
Cleveland, Ohio	5			0.34														0.05			
Columbia, Mo	23			0.16														*			
Columbia, S. C	4–5			1.25														0.24			
Columbus, Ohio	4–5			0.10														*			
Concord, N. H	5			0.29														*			
Corpus Christi, Tex	7			1.20														0.51			
Davenport, Iowa	4			0.12														*			
Del Rio, Tex	24			0.01														0.01			
Denver, Colo	23–24			0.20														*			
Des Moines, Iowa	27–28			0.60														*			
Detroit, Mich	20			0.42														0.08			
Dodge, Kans	27–28			0.14														*			
Dubuque, Iowa	6–7			0.28														*			
Duluth, Minn	27–28			0.48														*			
Eastport, Me	5			1.00														*			
Elkins, W. Va	4–6			0.94														*			
Erie, Pa	19			0.20														*			
Escanaba, Mich	27–28			0.44														*			
Evansville, Ind	23			0.43														*			
Fort Smith, Ark	28–1a			0.50														0.30			
Fort Worth, Tex	27	12:10 p. m	5:45 p. m.	1.04	2:30 p. m.	2:55 p. m.	0.15	0.09	0.22	0.38	0.52	0.60									
Galveston, Tex	25			1.30																	0.43
Grand Haven, Mich	21–22			0.25														*			
Grand Rapids, Mich	20			0.09														*			
Green Bay, Wis	27–28			0.06														*			
Hannibal, Mo	22–23			0.16														*			
Harrisburg, Pa	4–5			0.92														*			
Hartford, Conn	4–5			1.13														*			
Hatteras, N. C	5			0.36														0.29			
Huron, S. Dak	27–28			0.20														*			
Indianapolis, Ind	23–24			0.11														*			
Iola, Kans	28			0.18														0.12			
Jacksonville, Fla	19–20			0.32														0.19			
Jupiter, Fla	14			0.07														0.07			
Kansas City, Mo	28–1			0.28														0.10			
Key West, Fla	6			0.07														0.07			
Knoxville, Tenn	23–24			1.17														0.18			
La Crosse, Wis	6			0.14														*			
La Salle, Ill	4			0.05														*			
Lexington, Ky	23–24			1.06														*			
Lincoln, Nebr	27–28			0.88														*			
Little Rock, Ark	23–24			1.35													0.42				
Los Angeles, Cal	21–22			1.38														0.26			
Louisville, Ky	26			0.14														0.09			
Lynchburg, Va	24			0.50														*			
Macon, Ga	4			1.68														0.30			
Madison, Wis	4			0.11														*			
Marquette, Mich	27–1a			0.44														*			
Memphis, Tenn	31b–1			1.22														0.68			
Meridian, Miss	4	D. N.	11:15 a. m.	2.34	6:15 a. m.	8:15 a. m.	0.08	0.06	0.07	0.15	0.23	0.31	0.36	0.40	0.50	0.53	0.54	0.58	0.79	1.13	1.60
Do	24	2:35 p. m.	9:30 p. m.	1.65	3:16 p. m.	3:24 p. m.	0.01	0.28	0.36												
Do	28	D. N.	11:55 a. m.	3.56	7:51 a. m	9:41 a. m.	1.56	0.06	0.09	0.15	0.20	0.25	0.32	0.40	0.52	0.59	0.68	0.90	1.29	1.47	1.63
Milwaukee, Wis	24			0.07														0.06			
Minneapolis, Minn	27–28			0.54														*			
Mobile, Ala	28	9:25 a. m.	D. N.	6.41	2:18 p. m.	3:40 p. m.	0.14	0.08	0.31	0.53	0.55	0.59	0.78	1.07	1.14	1.23	1.49	1.96	2.37	2.55	
					7:33 p. m.	9:17 p. m.	3.82	0.14	0.32	0.61	0.66	0.71	0.83	0.86	0.94	1.15	1.22	1.31	1.54	2.21	
Montgomery, Ala	24–25			1.21														0.44			
Mount Weather, Va	4–5			0.96														*			
Nantucket, Mass	24–25			0.36														0.14			
Nashville, Tenn	28			0.67														0.51			
New Haven, Conn	4–5			1.23														*			
New Orleans, La	4			1.14														0.54			
New York, N. Y	4–5			1.07														0.12			
Norfolk, Va	3–5			1.37														0.33			
Northfield, Vt	5			0.30														*			
North Head, Wash	4			1.00														0.21			
Oklahoma, Okla	28			0.21														0.14			
Omaha, Nebr	27–28			0.66														0.20			
Palestine, Tex	27	8:00 p. m.	10:15 p. m.	0.43	8:03 p. m.	8:15 p. m.	T.	0.20	0.30	0.35											
Parkersburg, W. Va	23–24			0.59														0.10			
Pensacola, Fla	4	5:15 a. m.	8:10 a. m.	0.53	7:31 a. m.	7:41 a. m.	0.17	0.09	0.33												
Do	28	2:05 p. m.	9:45 p. m.	1.50	5:16 p. m.	6:05 p. m.	0.38	0.24	0.48	0.56	0.59	0.62	0.63	0.65	0.70	0.78	0.83	*			
Peoria, Ill	23–24			0.03														*			

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Philadelphia, Pa.	4–5			1.27														*			
Pittsburg, Pa.	17			0.07														0.06			
Portland, Me	5–6			0.85														*			
Portland, Oreg	24			0.54														0.15			
Pueblo, Colo	24			0.11														*			
Raleigh, N. C	19–20			0.99														0.10			
Richmond, Va	4–5			0.98														*			
Rochester, N. Y.	5–6			0.64														*			
Sacramento, Cal.	21–22			0.76														0.26			
St. Louis, Mo	22–24			0.65														*			
St. Paul, Minn	27–28			0.71														0.12			
Salt Lake City, Utah	3–5			1.18														*			
San Antonio, Tex	24			0.63														0.37			
San Diego, Cal.	16			0.39														0.25			
Sandusky, Ohio	5			0.15														*			
San Francisco, Cal	31b–2			2.14														0.31			
Savannah, Ga	7–8			1.12														0.22			
Scranton, Pa	4–6			0.86														*			
Seattle, Wash	23–24			0.97														0.16			
Shreveport, La	1			0.91														0.44			
Spokane, Wash.	8			0.43														*			
Springfield, Ill	23–24			0.14														*			
Springfield, Mo.	25–26			0.75														*			
Syracuse, N. Y.	5–7			0.29														*			
Tampa, Fla	5	7:10 a. m.	11:50 a. m.	0.70	9:07 a. m.	9:37 a. m.	0.09	0.10	0.24	0.29	0.36	0.46	0.55								
Taylor, Tex.	27			0.05														0.05			
Thomasville, Ga.	4			0.70														0.37			
Toledo, Ohio	4–5			0.08														*			
Topeka, Kans	27–28			1.11														0.23			
Valentine, Nebr.	19			0.10														*			
Vicksburg, Miss	24	2:25 p. m.	5:35 p. m.	1.28	3:35 p. m.	4:05 p. m.	0.10	0.10	0.22	0.39	0.60	0.78	0.85								
Do	27–28	7:50 p. m.	5:55 a. m.	1.84	12:41 a. m.	1:11 a. m.	0.27	0.12	0.16	0.19	0.30	0.43	0.53								
					1:50 a. m.	2:20 a. m.	0.87	0.13	0.22	0.33	0.57	0.68	0.74								
Washington, D. C	4–5			1.26														0.17			
Wichita, Kans	27–28			1.46														0.36			
Wilmington, N. C.	3–4			0.37														0.27			
Wytheville, Va.	4–5			0.76														*			
Yankton, S. Dak	27–28			0.35														*			
San Juan, Porto Rico	19			0.63														0.50			

*Self-register not working (a) Of March. (b) Of January.

TABLE V.—*Data furnished by the Canadian Meteorological Service, February, 1907.*

Stations.	Pressure, in inches. Actual, reduced to mean of 24 hours.	Pressure, in inches. Sea level, reduced to mean of 24 hours.	Pressure, in inches. Departure from normal.	Temperature. Mean.	Temperature. Departure from normal.	Temperature. Mean maximum.	Temperature. Mean minimum.	Precipitation. Total.	Precipitation. Departure from normal.	Precipitation. Total snowfall.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F	29.72	29.86	+.03	22.1	+ 0.1	29.9	14.4	5.33	+0.43	27.4
Sydney, C. B. I.				16.6	— 2.7	27.1	6.0	5.07	+0.98	36.5
Halifax, N. S.	29.86	29.97	+.02	19.0	— 3.4	27.9	10.1	4.49	—0.67	25.4
Grand Manan, N. B	29.90	29.96	—.02	19.1	— 4.3	27.7	10.4	4.87	+0.90	32.3
Yarmouth, N. S	29.90	29.98	—.01	21.4	— 4.4	29.1	13.7	4.26	—0.48	27.0
Charlottetown, P. E. I	29.91	29.95	.00	12.8	— 4.6	22.1	3.5	2.61	—0.45	15.8
Chatham, N. B	29.93	29.96	.00	8.4	— 4.1	21.2	— 4.4	2.73	—0.43	25.7
Father Point, Que.	29.94	29.97	—.01	6.8	— 4.7	14.9	— 1.2	1.71	—0.50	17.1
Quebec, Que	29.69	30.03	+.04	6.3	— 5.5	14.0	— 1.4	2.84	—0.43	28.4
Montreal, Que	29.83	30.06	+.04	9.5	— 5.0	17.5	1.4	2.80	—0.27	26.6
Rockliffe, Ont.	29.45	30.10	+.09	3.4	— 6.5	17.2	—10.3	2.08	+0.08	20.8
Ottawa, Ont	29.71	30.05	+.03	7.9	— 3.8	17.1	— 1.3	1.37	—1.32	13.7
Kingston, Ont.	29.78	30.12	+.08	13.4	— 4.4	22.3	4.4	1.15	—1.39	9.6
Toronto, Ont	29.70	30.10	+.06	18.5	— 3.0	26.8	10.2	0.87	—1.74	7.2
White River, Ont	28.64	30.04	+.02	—2.0	— 2.2	15.1	—19.0	2.28	+0.76	22.8
Port Stanley, Ont	29.40	30.07	+.01	18.9	— 3.9	27.9	9.8	0.91	—2.30	7.3
Saugeen, Ont.	29.36	30.10	+.08	16.6	— 3.3	27.3	5.8	1.72	—1.18	16.7
Parry Sound, Ont	29.36	30.11	+.10	9.8	— 4.5	21.1	— 1.6	3.79	+0.87	34.5
Port Arthur, Ont.	29.37	30.13	+.08	7.2	+ 0.8	19.4	— 5.0	0.80	—0.10	8.0
Winnipeg, Man	29.26	30.15	+.05	4.6	+ 6.2	15.9	— 6.6	0.27	—0.71	2.7
Minnedosa, Man	28.21	30.14	+.05	6.3	+ 9.0	17.6	— 5.0	0.30	—0.31	3.0
Qu'Appelle, Sask	27.75	30.12	+.04	9.1	+ 9.7	18.8	— 0.5	0.39	—0.34	3.9
Medicine Hat, Alberta.	27.70	30.07	+.02	19.6	+ 8.4	28.6	10.6	0.25	—0.42	2.5
Swift Current, Sask.	27.44	30.15	+.08	13.9	+ 5.9	22.8	4.9	0.36	—0.38	3.6
Calgary, Alberta	26.38	30.06	+.07	21.0	+ 7.5	32.1	9.8	0.20	—0.43	2.0
Banff, Alberta	25.33	30.10	+.12	21.4	+ 2.2	31.5	11.3	0.56	—0.36	5.6
Edmonton, Alberta	27.67	30.07	+.05	14.4	+ 6.1	24.7	4.2	0.27	—0.40	2.7
Prince Albert, Sask.	28.43	30.07	—.02	4.2	+ 7.2	16.1	— 7.6	0.46	—0.23	4.5
Battleford, Sask.	28.27	30.12	+.03	4.8	+ 4.7	15.8	— 6.1	0.07	—0.30	0.7
Kamloops, B. C.	28.86	30.12	+.16	25.8	— 2.5	32.1	19.6	0.56	—0.23	5.6
Victoria, B. C.	29.98	30.08	+.08	41.7	+ 2.2	46.4	37.0	3.96	—0.14	0.7
Barkerville, B. C.										
Hamilton, Bermuda	29.99	30.16	+.05	62.4	+ 0.9	67.2	57.6	5.76	+1.32	
Dawson, Yukon	28.85			—26.2		—18.2	—34.1	0.34		3.4

TABLE VI.—*Heights of rivers referred to zeros of gages, February, 1907.*

Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water. Height.	Highest water. Date.	Lowest water. Height.	Lowest water. Date.	Mean stage.	Monthly range.
Milk River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Havre, Mont. (15)	237	9	8.0	15	3.8	10–11		4.2
James River.								
Huron, S. Dak. (15)	139	9	8.3	20–23	1.7	16		6.6
Big Blue River								
Beatrice, Nebr. (13)	92	14	4.7	18	2.5	14	3.3	2.2
Blue Rapids, Kans. (8)	47	14	5.8	18	4.0	27, 28	4.9	1.8
Republican River.								
Clay Center, Kans. (10)	42	18	7.3	19–24	6.1	14	6.8	1.2
Solomon River.								
Beloit, Kans.	75	16	1.8	17	0.5	28	0.9	1.3
Smoky Hill-Kansas River.								
Lindsborg, Kans.	341	20	2.3	22, 27	1.5	11, 15	1.9	0.8
Abilene, Kans.	277	22	1.0	21, 22	0.4	9, 12–14	0.7	0.6
Smoky Hill-Kans. Riv.—Con.								
Manhattan, Kans	116	18	4.9	13	3.4	1–8	4.2	1.5
Topeka, Kans. (6)	87	21	7.5	22, 23	6.3	1	6.9	1.2
Osage River.								
Bagnell, Mo.	70	28	9.1	1	2.3	28	3.9	6.8
Gasconade River.								
Arlington, Mo.	98	16	2.5	27	0.3	22–25	0.9	2.2
Missouri River.								
Bismarck, N. Dak.	1,309	14	8.4	28	1.3	1, 2	3.0	7.1
Pierre, S. Dak. (22)	1,114	14						
Sioux City, Iowa	784	17	14.0*	19	8.5	7–9	9.8	5.5
Blair, Nebr.	705	15	11.6	20	7.5	8–12	8.8	4.1
Omaha, Nebr. (18)	669	18						
St. Joseph, Mo	481	10	8.4	22	—1.1	1	2.9	9.5

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Missouri River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Kansas City, Mo.	388	21	16.2	23	4.3	1	8.9	11.9
Glasgow, Mo.	231	18	11.7	24	1.9	8	6.1	9.8
Boonville, Mo.	199	20	16.3	24	7.7	6	11.3	8.6
Hermann, Mo.	103	24	12.6	25	5.4	9,10	8.8	7.2
Minnesota River.								
Mankato, Minn.	127	18	6.9	21–23	2.7	2,3	4.2	4.2
Chippewa River.								
Chippewa Falls, Wis. (29)	75	16	.....	.....	.....	.....	.....	.....
Red Cedar River.								
Cedar Rapids, Iowa	77	14	6.6	23	3.8	12	4.8	2.8
Des Moines River.								
Des Moines, Iowa (13)	205	19	2.9	23,24	2.0	16–19	.....	0.9
Illinois River.								
La Salle, Ill. (30)	197	18	22.7	1	17.5	28	19.6	5.2
Peoria, Ill.	135	14	18.1	1	13.5	28	15.1	4.6
Beardstown, Ill.	23	11	18.1	1	12.7	28	15.0	5.4
Clarion River.								
Clarion, Pa.	32	10	8.0	3,4	2.7	1	5.1	5.3
Conemaugh River.								
Johnstown, Pa.	64	7	4.6	3	2.3	28	3.0	2.3
Allegheny River								
Warren, Pa. (17)	177	14	1.7	1–3	1.5	7–11	.....	0.2
Franklin, Pa. (26)	114	15	6.8	3	.....	.....	.....	.....
Parker, Pa. (29)	73	20	.....	.....	.....	.....	.....	.....
Freeport, Pa.	29	20	6.5	4	4.3	28	5.2	2.2
Springdale, Pa.	17	27	10.8	4	8.0	13	9.0	2.8
Cheat River.								
Rowlesburg, W. Va. (15)	36	14	5.3	2	2.6	24,25	.....	2.7
Youghiogheny River.								
Confluence, Pa. (2)	59	10	6.6	3	1.5	13	2.2	5.1
West Newton, Pa.	15	23	8.0	3	2.0	9,10	3.8	6.0
Monongahela River.								
Weston, W. Va.	161	18	4.0	2	0.0	15-19,22,23	0.7	4.0
Fairmont, W. Va.	119	25	21.5	2	15.2	24	16.6	6.3
Greensboro, Pa.	81	18	15.7	2	8.0	24	9.5	7.7
Lock No. 4, Pa.	40	28	21.6	3	8.0	25	10.8	13.6
Beaver River.								
Ellwood Junction, Pa. (13)	10	14	3.4	16	2.5	28	3.0	0.9
Muskingum River.								
Zanesville, Ohio	70	25	12.7	4	9.5	13	10.7	3.2
Beverly, Ohio	20	25	11.6	3	7.5	12,13	8.9	4.1
Little Kanawha River.								
Glenville, W. Va.	77	20	9.6	2	0.8	22	2.7	8.8
Creston, W. Va.	38	20	13.2	2	3.4	24	5.4	9.8
New-Great Kanawha River.								
Radford, Va.	213	14	3.5	27	0.9	22–24	1.5	2.6
Hinton, W. Va.	153	14	4.4	28	2.3	25	3.0	2.1
Charleston, W. Va.	58	30	10.5	3	5.2	1, 10, 23	6.4	5.3
Scioto River.								
Columbus, Ohio (24)	110	17	3.5	1	.....	.....	.....	.....
Licking River.								
Falmouth, Ky.	30	25	10.0	3	2.2	23	4.6	7.8
Miami River.								
Dayton, Ohio	77	18	3.4	2,6	2.4	28	2.8	1.0
Kentucky River.								
Jackson, Ky.	287	24	10.5	25, 28	4.9	23	6.4	5.6
Beattyville, Ky.	254	30	11.0	25	1.3	23	3.6	9.7
High Bridge, Ky.	117	17	17.5	27	10.8	23, 24	12.8	6.7
Frankfort, Ky.	65	31	12.8	27	6.5	23, 24	8.5	6.3
Wabash River.								
Terre Haute, Ind.	171	16	7.3	1	3.0	26–28	4.2	4.3
Mount Carmel, Ill.	75	15	21.1	1	5.7	28	8.7	15.4
Cumberland River.								
Burnside, Ky.	518	50	34.0	26	3.2	23	8.8	30.8
Celina, Tenn.	383	45	32.8	27	5.3	23	11.3	27.5
Carthage, Tenn.	308	40	29.0	28	4.4	23	9.8	24.6
Nashville, Tenn.	193	40	31.3	28	10.1	23	14.3	21.2
Clarksville, Tenn.	126	42	34.4	28	8.6	23	16.2	25.8
Powell River.								
Tazewell, Tenn.	44	20	7.4	26	0.8	22, 23	2.3	6.6
Clinch River.								
Speers Ferry, Va.	156	20	2.9	27	0.3	23	1.2	2.6
Clinton, Tenn.	52	25	14.0	27	5.2	24	7.9	8.8
South Fork Holston River.								
Bluff City, Tenn.	35	15	2.7	28	1.0	19,20,23,24	1.5	1.7
Holston River.								
Mendota, Va.	165	8	3.2	28	1.2	22-24	1.7	2.0
Rogersville, Tenn.	103	14	3.8	27, 28	2.2	1,21,23,24	2.8	1.6
French Broad River.								
Asheville, N. C.	144	6	1.0	5	— 0.1	20–24	0.2	1.1
Dandridge, Tenn.	46	12	2.6	6	1.2	20–23	1.6	1.4
Little Tennessee River.								
McGhee, Tenn.	17	20	9.1	2	3.7	24	4.7	5.4
Hiwassee River.								
Charleston, Tenn.	18	22	11.5	2	2.2	20, 23	4.1	9.3
Tennessee River.								
Knoxville, Tenn.	635	12	4.5	7	1.7	22	2.7	2.8
Loudon, Tenn.	590	25	5.3	2	2.1	23	3.2	3.2
Kingston, Tenn.	556	25	7.3	28	2.6	22, 23	4.2	4.7
Chattanooga, Tenn.	452	33	11.2	3	4.4	24	7.0	6.8
Bridgeport, Ala.	402	24	9.8	3	3.0	24	5.2	6.8
Guntersville, Ala.	349	31	17.1	5	6.2	22	9.4	10.9
Florence, Ala.	255	16	12.0	4	3.2	22, 23	6.2	8.8
Riverton, Ala.	225	26	20.5	4	5.8	23	10.4	14.7
Johnsonville, Tenn.	98	21	22.5	5	6.0	23, 24	11.9	16.5
Ohio River.								
Pittsburg, Pa.	966	22	11.7	3	3.3	9, 13, 14, 25	4.9	8.4
Dam No. 2, Pa.	956	25	11.2	3	4.6	14	6.1	6.6
Beaver Dam, Pa.	925	27	16.5	4	7.2	14	9.2	9.3
Wheeling, W. Va.	875	36	16.2	4	7.0	'5, 26	8.9	9.2
Parkersburg, W. Va.	785	36	16.9	5	8.3	10	10.9	8.6
Point Pleasant, W. Va.	703	39	22.6	4	10.5	14, 15	13.4	12.1

Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Ohio River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Huntington, W. Va.	660	50	32.8	4	14.7	1	18.2	18.1
Catlettsburg, Ky.	651	50	28.8	4	14.5	1	18.4	14.3
Portsmouth, Ohio	612	50	29.5	4	15.7	20	19.4	13.8
Maysville, Ky.	559	50	29.0	5	16.0	22, 23	19.4	13.0
Cincinnati, Ohio.	499	50	31.4	6	17.4	23	22.0	14.0
Madison, Ind.	413	46	26.8	6	15.9	24	19.8	10.9
Louisville, Ky.	367	28	10.2	6	6.8	24, 25	8.1	3.4
Evansville, Ind.	184	35	39.0	1	14.4	24	22.0	24.6
Mount Vernon, Ind.	148	35	44.0	1	13.7	25	22.9	30.3
Paducah, Ky.	47	40	44.3	1	14.1	23	25.7	30.2
Cairo, Ill.	1	45	48.7	1	22.4	23	32.6	26.3
St. Francis River.								
Marked Tree, Ark.	104	17	18.2	1,2	15.2	27, 28	16.7	3.0
Neosho River.								
Neosho Rapids, Kans.	326	22	5.2	11	1.3	26	2.2	3.9
Iola, Kans.	262	10	1.9	12	0.6	4–7, 25–28	0.9	1.3
Oswego, Kans.	184	20	2.4	14	0.8	27, 28	1.4	1.6
Fort Gibson, Ind. T.	3	22	11.8	1	9.0	23–28	9.9	2.8
Canadian River.								
Calvin, Ind. T. (3)	99	10	3.2	15	2.2	8	2.6	1.0
Black River.								
Blackrock, Ark.	67	12	16.5	28	6.0	24	11.0	10.5
White River.								
Calicorock, Ark.	272	15	5.8	28	2.0	23	3.2	3.8
Batesville, Ark.	217	18	8.0	28	4.0	22, 23	5.4	4.0
Newport, Ark.	185	26	18.0	1	6.0	23	11.2	12.0
Clarendon, Ark.	75	30	28.8	1	22.1	26	25.9	6.7
Arkansas River.								
Wichita, Kans.	832	10	1.7	14	—0.4	5	0.5	2.1
Tulsa, Ind. T.	551	16	4.1	11	3.7	25–28	3.9	0.4
Webbers Falls, Ind. T.	465	23	9.0	1	5.6	14	6.5	3.4
Fort Smith, Ark.	403	22	9.2	1	4.8	25	5.9	4.4
Dardanelle, Ark.	256	21	11.8	1	4.7	23, 25, 26	6.0	7.1
Little Rock, Ark.	176	23	15.3	1	6.2	23, 24	8.1	9.1
Pine Bluff, Ark.	121	23	18.2	1	8.4	24	10.8	9.8
Yazoo River.								
Greenwood, Miss.	175	38	23.3	3	17.4	26, 27	22.1	7.9
Yazoo City, Miss.	80	25	26.1	14, 16	23.4	28	25.2	2.7
Ouachita River.								
Camden, Ark.	304	39	17.5	28	7.0	25	10.5	10.5
Monroe, La.	122	40	37.6	4	29.0	27	33.6	8.6
Red River								
Denison, Tex.	768	22	4.2	3,4	1.0	27	1.8	3.2
Arthur City, Tex.	688	27	9.5	1	7.5	21–25, 27	8.1	2.0
Fulton, Ark.	515	28	12.6	1	8.7	25, 26	10.7	3.9
Shreveport, La.	327	29	9.4	1	3.2	26–28	6.0	6.2
Alexandria, La.	118	33	16.2	1,4	11.1	28	13.6	5.1
Mississippi River.								
Fort Ripley, Minn. (28)	2,082	10	.....	.....	.....	.....	.....	.....
St. Paul, Minn. (28)	1,954	14	.....	.....	.....	.....	.....	.....
Reeds Landing, Minn. (14)	1,884	12	2.8	25–28	2.6	15–23	2.7	0.2
La Crosse, Wis. (28)	1,819	12	.....	.....	.....	.....	.....	.....
Prairie du Chien, Wis. (28)	1,759	18	.....	.....	.....	.....	.....	.....
Dubuque, Iowa (28)	1,699	18	.....	.....	.....	.....	.....	.....
Clinton, Iowa (28)	1,629	16	.....	.....	.....	.....	.....	.....
Leciaire, Iowa (28)	1,609	10	.....	.....	.....	.....	.....	.....
Davenport, Iowa	1,593	15	5.5	23	3.0	13	4.2	2.5
Muscatine, Iowa	1,562	16	7.2	23	4.7	2	5.8	2.5
Galland, Iowa (10)	1,472	8	3.8	1	2.2	5, 6, 21	2.9	1.6
Keokuk, Iowa (10)	1,463	15	10.0	18	3.4	5	5.6	6.6
Warsaw, Ill.	1,458	18	12.5	11	6.4	6	9.2	6.1
Hannibal, Mo.	1,402	13	6.8	28	2.8	8	5.0	4.0
Grafton, Ill.	1,306	23	11.8	1	7.8	9, 10	9.5	4.0
St. Louis, Mo.	1,264	30	16.5	1	7.6	10, 11	12.1	8.9
Chester, Ill.	1,189	30	15.4	1	7.4	12	10.7	8.0
Cape Girardeau, Mo.	1,128	28	22.3	1	11.7	13	15.8	10.6
New Madrid, Mo.	1,003	34	38.7	1	18.5	24	26.8	20.2
Luxora, Ark.	905	33	34.9	1,2	12.4	23	22.8	22.5
Memphis, Tenn.	843	33	40.3	3	16.6	25	28.6	23.7
Helena, Ark.	767	42	50.4	5,6	24.0	26	40.0	26.4
Arkansas City, Ark.	635	42	52.1	8	32.6	28	46.8	19.5
Greenville, Miss.	595	42	47.3	8,9	27.9	28	42.1	19.4
Vicksburg, Miss.	474	45	49.7	11	39.9	28	47.5	9.8
Natchez, Miss.	373	46	48.9	13, 14	43.5	28	47.4	5.4
Baton Rouge, La.	240	35	37.3	14–19	34.0	1	36.1	3.3
Donaldsonville, La.	188	28	30.1	16–19	27.3	1	29.0	2.8
New Orleans, La.	108	16	19.8	13-17,19,21	18.3	1	19.2	1.5
Atchafalaya River.								
Simmesport, La.	127	33	42.5	19, 20	37.5	1	40.8	5.0
Melville, La.	103	31	37.7	19, 20	35.2	1	36.8	2.5
Morgan City, La.	19	8	5.0	28	3.2	8	4.1	1.8
Grand River.								
Eaton Rapids, Mich.	166	6	3.8	1–15	3.6	17, 21–28	3.7	0.2
Lansing, Mich.	140	11	4.4	4	2.4	27	3.3	2.0
Grand Ledge, Mich.	129	6	3.2	19, 20	2.7	13–16, 27	2.9	0.5
Portland, Mich.	103	12	9.8	1	5.1	27, 28	6.8	4.7
Ionia, Mich.	81	24	16.3	1	8.9	27	11.8	7.4
Grand Rapids, Mich.	38	11	11.3	1	4.7	28	8.1	6.6
Sandusky River.								
Tiffin, Ohio (14)	65	7	1.3	18, 19, 24	1.0	15, 27, 28	1.2	0.3
Penobscot River.								
Mattawamkeag, Me. (28)	87	.....	.....	.....	.....	.....	.....	.....
West Enfield, Me. (28)	60	.....	.....	.....	.....	.....	.....	.....
Kennebec River.								
Winslow, Me.	46	8	5.1	25	4.1	3	4.6	1.0
Merrimac River.								
Franklin Junc., N. H (18)(b)	110	13	5.2	1, 2, 8, 9	5.0	5	.....	0.2
Concord, N. H. (28)	94	10	.....	.....	.....	.....	.....	.....
Manchester, N. H.	68	8	3.5	3	0.9	28	2.2	2.6
Connecticut River.								
Wells River, Vt. (28)	255	34	.....	.....	.....	.....	.....	.....
Whiteriver Junction, Vt (28)	209	.....	.....	.....	.....	.....	.....	.....

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Connecticut River—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Bellows Falls, Vt	170	12	2.8	3	1.0	15, 16, 23	1.7	1.8
Holyoke, Mass	84	9	3.4	3	0.1	2, 9, 23	1.6	3.3
Hartford, Conn.(28)	50	16						
Housatonic River.								
Gaylordsville, Conn	44	15	4.5	2-4, 8, 9	3.9	5	4.3	0.6
Mohawk River.								
Utica, N. Y.	98	6	3.0	1	2.4	8-28	2.5	0.6
Tribeshill, N. Y.	42	12	1.2	1, 2	0.3	14, 26, 27	0.6	0.9
Schenectady, N. Y.	19	15	2.0	2	1.5	3-28	1.5	0.5
Hudson River.								
Glens Falls, N. Y.	197	20	4.0	10	3.6	{2, 20, 21, / 23, 28}	3.8	0.4
Troy, N. Y.	154	14	4.9	1	3.2	13	4.1	1.7
Albany, N. Y.	147	12	4.1	2	1.0	26	2.7	3.1
Stuyvesant, N. Y.	128	9	4.5	2	−1.0	8	1.6	5.5
Pompton River.								
Pompton Plains, N. J.(28)	6	8						
Passaic River.								
Chatham, N. J.(28)	69	7						
Lehigh River.								
Mauch Chunk, Pa (28)	45	15						
Schuylkill River.								
Reading, Pa	66	12	0.9	1-4	0.2	26-28	0.5	0.7
Delaware River.								
Hancock (E. Branch), N. Y.	287	12	8.0	2	5.3	23, 28	6.2	2.7
Hancock (W. Branch), N. Y.	287	10	4.6	14, 15	3.9	1, 22, 27, 28	4.2	0.7
Port Jervis, N. Y. (3)	215	14	2.4	23	0.9	26	1.7	1.5
Phillipsburg, N. J.(26)	146	26						
Trenton, N. J.	92	18	8.5	1-6	4.0	14-28	5.3	4.5
North Branch Susquehanna.								
Binghamton, N. Y.	183	16	3.5	4	2.2	20, 25	2.6	1.3
Towanda, Pa	139	16	7.0	7	3.0	2	4.8	4.0
Wilkes-Barre, Pa.	60	17	9.4	1	3.7	25-27	6.0	5.7
West Branch Susquehanna.								
Clearfield, Pa	165	8	3.7	5	1.4	1, 2	2.6	2.3
Renovo, Pa.(23)	90	16	2.4	3, 4	2.0	6	.....	0.4
Williamsport, Pa.	39	20	3.6	3	1.6	27	2.4	2.0
Juniata River.								
Huntingdon, Pa.	90	24	4.1	11	3.4	23, 27, 28	3.7	0.7
Susquehanna River.								
Selinsgrove, Pa.	116	17	2.2	2-4, 11, 12	1.6	26, 27	2.0	0.6
Harrisburg, Pa.	69	17	5.9	10-12	2.7	6	4.3	3.2
Shenandoah River.								
Riverton, Va.	58	22	− 0.3	1-3	− 0.5	5-28	−0.5	0.2
Potomac River.								
Cumberland, Md.	290	8	3.8	5, 6	3.5	1-3, 14-28	3.6	0.3
Harpers Ferry, W. Va.	172	18	4.2	5, 19, 20	2.5	27, 28	3.3	1.7
James River.								
Buchanan, Va.	305	12	4.2	12	3.2	1	3.6	1.0
Lynchburg, Va.	260	18	2.2	14, 15, 28	1.5	4, 5	1.9	0.7
Columbia, Va.	167	18	6.6	14	4.6	26	5.5	2.0
Richmond, Va.	111	12	1.4	20	0.4	10	1.0	1.0
Dan River.								
Danville, Va.	55	8	1.0	27	− 0.1	17-20	0.1	1.1
Staunton River.								
Randolph, Va.	26	28	6.8	28	5.4	10, 11, 17	5.6	1.4
Roanoke River.								
Clarksville, Va.	196	12	4.5	26	0.7	9, 19	1.6	3.8
Weldon, N. C.	129	30	18.2	28	10.7	10	11.8	7.5
Tar River.								
Tarboro, N. C.	46	25	12.5	28	3.8	1	6.6	8.7
Greenville, N. C.	21	22	10.9	28	5.8	1	7.7	5.1
Haw River.								
Moncure, N. C.	171	25	13.7	26	8.3	1	9.4	5.4
Cape Fear River.								
Fayetteville, N. C.	112	38	23.0	27	4.2	1	10.1	18.8
Waccamaw River.								
Conway, S. C.	40	7	3.4	14	1.8	3	2.7	1.6
Pedee River.								
Cheraw, S. C.	149	27	12.3	27	2.6	1, 20	5.5	9.7
Smiths Mills, S. C.	51	16	10.5	27, 28	5.0	2-4	8.4	5.5
Lynch Creek.								
Effingham, S. C.	35	12	8.9	14	5.2	20, 21	7.1	3.7
Black River.								
Kingstree, S. C.(4)	45	12	9.6	14	4.3	1	6.7	5.3
Catawba-Wateree River.								
Mount Holly, N. C.	143	15	2.4	5, 6	1.8	16-20	2.0	0.6
Catawba, S. C.	107	11	3.4	27	2.1	1, 15, 16, 19	2.6	1.3
Camden, S. C.	37	24	15.8	5	5.6	18	8.2	10.2
Broad River.								
Blairs, S. C.	36	14	5.5	5	0.8	16, 19	2.0	4.7
Saluda River.								
Pelzer, S. C.	109	7	4.6	5-9	3.7	1, 19, 22, 23	4.2	0.9
Chappels, S. C.	56	14	8.0	5	2.7	19	3.7	5.3
Congaree River.								
Columbia, S. C.	52	15	7.7	6	1.1	1, 24	2.3	6.6
Santee River.								
Rimini, S. C.	108	12	13.3	9, 10	7.4	19	10.1	5.9
St. Stephens, S. C.	50	10	9.0	15, 16	5.3	1-3	7.6	3.7
Edisto River.								
Edisto, S. C.	75	6	5.2	11	3.2	3	4.1	2.0
Broad River.								
Carlton, Ga.	30	11	6.0	5, 6	2.6	1	3.3	3.4
Savannah River.								
Calhoun Falls, S. C.	347	15	7.0	5	3.1	21, 22	3.8	3.9
Augusta, Ga.	268	32	22.5	6	8.8	18, 19, 25	11.2	13.7
Oconee River.								
Milledgeville, Ga.	147	25	18.0	5	3.5	24	6.2	14.5
Dublin, Ga	79	30	13.5	10	1.7	1	5.6	11.8
Ocmulgee River.								
Macon, Ga.	203	18	16.2	5	3.7	24	6.8	12.5
Abbeville, Ga.	96	11	12.3	12	4.0	1	7.5	8.3
Flint River.								
Woodbury, Ga.	227	10	5.0	7	0.9	24	2.1	4.1
Montezuma, Ga.	152	20	13.0	8, 9	4.5	25, 26	7.0	8.5
Albany, Ga.	90	20	11.1	11	3.2	19, 27	5.7	7.9
Bainbridge, Ga.	29	22	10.6	12, 13	4.9	1, 2	6.9	5.7
Chattahoochee River.								
Oakdale, Ga	305	18	12.0	5	3.8	19, 24	5.5	8.2
West Point, Ga	239	20	11.8	6	3.6	23, 24	5.2	8.2
Eufaula, Ala	90	40	22.6	7	4.5	26	8.7	18.1
Alaga, Ala.	30	25	22.1	7	6.3	25	10.2	15.8
Coosa River.								
Rome, Ga.	266	30	13.6	5	3.0	1, 19-24	6.1	10.6
Gadsden, Ala.	162	22	14.9	6	4.0	22	7.8	10.9
Lock No. 4, Ala.	113	17	13.3	5	3.5	21-24	6.9	9.8
Wetumpka, Ala	12	45	32.4	6	8.0	24	15.9	24.4
Tallapoosa River.								
Milstead, Ala.	42	35	22.7	6	4.0	24	8.9	18.7
Alabama River.								
Montgomery, Ala.	323	35	30.7	7	5.6	24	13.6	25.1
Selma, Ala	246	35	33.9	8	7.1	24	16.1	26.8
Black Warrior River.								
Tuscaloosa, Ala.	90	43	50.2	2, 3	9.0	24	22.4	41.2
Tombigbee River.								
Columbus, Miss	316	33	15.7	2	− 0.2	24	5.7	15.9
Vienna, Ala.	246	42	26.0	6	2.2	25	11.2	23.8
Demopolis, Ala.	168	35	44.7	9	6.8	24	25.0	37.9
Leaf River.								
Hattiesburg, Miss	60	20	8.7	8	3.4	24	5.1	5.3
Chickasawhay River.								
Enterprise, Miss	144	18	16.2	5	2.4	23, 24	6.9	13.8
Shubuta, Miss	106	25	22.0	9	4.7	22-24	11.3	17.3
Pascagoula River.								
Merrill, Miss.	78	20	13.4	10	4.7	25	8.4	8.7
Pearl River.								
Jackson, Miss	242	20	19.5	9	4.5	1	13.1	15.0
Columbia, Miss.	110	14	13.8	8	6.1	26	9.3	7.7
Sabine River.								
Logansport, La.	315	25	11.0	5	5.3	24, 25	7.6	5.7
Neches River.								
Rockland, Tex	105	20	5.1	3, 4	2.4	24	3.9	2.7
Beaumont, Tex.	18	10	1.9	28	0.7	8	1.2	1.2
Trinity River.								
Dallas, Tex.	320	25	9.4	28	4.2	20-24	4.7	5.2
Long Lake, Tex.	211	35	7.1	5	4.8	23	6.1	2.3
Riverside, Tex.	112	40	4.2	4	2.1	24	3.0	2.1
Liberty, Tex	20	25	8.2	28	5.2	20, 23, 24	6.2	3.0
Brazos River.								
Kopperl, Tex.	345	21	0.2	1, 2	− 0.2	20-28	0.0	0.4
Waco, Tex.	285	24	3.6	1-7, 9-11	3.1	20-27	3.4	0.5
Valley Junction, Tex.	215	40	− 0.4	1, 5-28	− 0.5	2-4	−0.4	0.1
Hempstead, Tex	140	40	3.3	25	− 1.8	24	−1.0	5.1
Booth, Tex	61	39	3.8	28	2.4	25	2.9	1.4
Colorado River.								
Ballinger, Tex.	489	21	0.8	1-16	0.7	17-28	0.8	0.1
Austin, Tex.	214	18	1.2	10, 11, 27, 28	1.1	1-9, 12-26	1.1	0.1
Columbus, Tex.	98	24	10.7	25	6.4	15-18	6.9	4.3
Guadalupe River.								
Gonzales, Tex.	112	22	2.2	25	0.5	{1-7, 10-19, / 22-24}	0.6	1.7
Victoria, Tex	35	16	4.4	27	1.2	{4-6, 11, 18, / 19}	1.6	3.2
Red River of the North.								
Moorhead, Minn. (28)	284	26						
Snake River.								
Lewiston, Idaho	144	24	10.2	7	3.2	1	6.8	7.0
Riparia, Wash.	67	30						
Columbia River.								
Wenatchee, Wash	473	40	8.0	1-3	7.3	26	7.7	0.7
Umatilla, Oreg.(5)	270	25	7.6	9	3.0	1	5.7	4.6
The Dalles, Oreg.	166	40	13.2	9	5.5	4, 5	9.1	7.7
Willamette River.								
Albany, Oreg.	118	20	30.6	6	5.0	22-26	11.6	25.6
Salem, Oreg	84	20	29.8	6	4.1	23	11.2	25.7
Portland, Oreg.	12	15	22.4	8	5.0	20	11.0	17.4
Sacramento River.								
Kennett, Cal	323	23	21.2	2	5.6	20, 21	9.6	15.6
Red Bluff, Cal.	265	23	24.4	4	6.3	21	11.9	18.1
Colusa, Cal.	156	25	28.2	6	16.1	22	22.1	12.1
Knights Landing, Cal	99	.....	18.8	6	14.9	23	16.3	3.9
Sacramento, Cal.	64	25	27.2	7	20.5	25, 28	23.3	6.7
Rio Vista, Cal.	26	12	13.3	10	5.9	24	9.0	7.4
San Joaquin River.								
Pollasky, Cal.	203	10	2.5	3, 22	1.4	21	1.9	1.1
Firebaugh, Cal	148	.....	6.7	24	4.6	22	5.5	2.1
Lathrop, Cal	49	15	16.7	7	12.4	22	14.4	4.3

(b) Two days missing. (d) Four days missing, gage temporarily removed. *Estimated. Figures indicate number of days frozen.

Honolulu, T. H., latitude 21° 19′ north, longitude 157° 30′ west; barometer above sea, 38 feet; gravity correction, —0.057 inch, applied. February, 1907.

Day.	Pressure.*		Air temperature.				Moisture.				Wind.				Precipitation.		Clouds.					
							8 a. m.		8 p. m.		8 a. m.		8 p. m.				8 a. m.			8 p. m.		
	8 a. m.	8 p. m.	8 a. m.	8 p. m.	Maximum.	Minimum.	Wet.	Relative humidity.	Wet.	Relative humidity.	Direction.	Velocity.	Direction.	Velocity.	8 a. m.	8 p. m.	Amount.	Kind.	Direction.	Amount.	Kind.	Direction.
1	29.94	29.94	71.0	72.5	75	67	69.0	90	68.5	82	e.	2	s.	12	0.52	0.07	10	S.	se.	10	N.	s.
2	29.87	29.82	72.0	72.0	73	70	68.4	84	70.0	91	s.	18	se.	19	0.07	0.18	10	S.	s.	10	S.	se.
3	29.85	29.89	71.0	71.0	77	64	70.0	95	68.0	86	n.	3	nw.	5	3.20	0.08	8	S.-cu.	w.	0	0	0
4	29.97	29.96	73.5	71.5	78	67	69.0	80	68.0	84	n.	4	ne.	4	0.00	0.00	few.	A.-cu.	0	1	S.	0
5	30.00	29.97	71.0	75.0	78	69	70.0	95	71.0	82	se.	8	s.	1	0.09	0.01	4 5	A.-cu. N.	w. w.	4	S	s.
6	29.96	29.95	75.0	72.0	78	69	71.0	82	69.5	88	ne.	3	w.	5	0.53	0.23	2	S.-cu.	sw.	5	S.	s.
7	29.96	29.87	75.0	74.0	77	69	69.0	76	69.0	78	ne.	2	s.	8	0.10	0.00	few. few.	Cu. S.-cu.	0 0	1 1	N. Cu.	s. s.
8	29.89	29.86	73.5	69.2	78	68	70.0	84	68.0	94	sw.	17	w.	12	0.40	0.04	1 3	A.-s. S.-cu.	0 w.	1 9	S. N.	s. w.
9	29.94	29.96	70.0	68.5	76	66	63.2	69	60.5	62	n.	4	n.	5	0.01	0.00	0	0	0	1	S.	n.
10	30.00	30.01	70.5	71.2	77	64	62.2	62	65.0	71	e.	4	se.	4	0.00	0.00	few.	Cu.	0	0	0	0
11	30.03	30.02	73.0	71.8	78	68	67.0	73	68.3	84	e.	8	se.	2	0.00	0.01	7	Cu.	e.	2	Cu.	se.
12	30.08	30.06	72.0	74.5	80	65	66.0	73	66.0	64	ne.	4	e.	8	0.00	0.00	4 2	Cl. Cl.-cu.	w. w.	0	0	0
13	30.10	30.09	75.0	73.7	79	70	66.0	62	66.0	66	e.	12	e.	12	0.00	T.	2	Cu.	e.	few.	S.-cu.	e.
14	30.13	30.12	74.0	74.0	78	70	65.0	61	65.5	63	ne.	8	e.	5	T.	T.	2	Cu.	e.	2 3	N. S.	e. e.
15	30.17	30.17	73.0	72.5	77	70	64.0	61	64.0	63	ne.	16	ne.	9	0.00	0.00	6	Cu.	e.	3 2	Cl.-cu. S.	w. e.
16	30.16	30.14	70.2	71.0	76	64	64.0	71	65.0	72	e.	13	e.	8	0.05	0.06	2 5	A.-cu. Cu.	nw. e.	5	Cu.	e.
17	30.14	30.09	72.2	72.5	77	67	64.2	65	65.0	67	e.	12	e.	10	0.14	0.02	4	Cu.	e.	few.	Cu.	e.
18	30.12	30.11	72.0	71.0	78	69	62.0	57	63.0	64	e.	8	e.	6	0.00	T.	4	Cu.	e.	2 3	A.-s. Cu.	0 e.
19	30.14	30.11	73.0	71.0	76	68	63.0	57	65.0	72	ne.	10	e.	6	0.00	0.00	3	Cu.	e.	8	Cu.	e.
20	30.15	30.10	71.2	71.0	77	69	64.0	67	63.0	64	e.	11	e.	6	T.	T.	2 5	Cu. N.	e. e.	few.	Cu.	e.
21	30.11	30.07	72.0	71.0	77	66	61.3	54	63.0	64	e.	12	e.	5	0.00	0.00	few.	Cu.	e.	1	Cu.	e.
22	30.09	30.07	70.5	71.0	77	67	64.0	70	65.9	72	n.	3	ne.	12	0.00	0.00	10	S.-cu.	se.	6 2	A.-s. A.-cu.	nw. nw.
23	30.12	30.13	70.0	72.3	77	68	64.0	72	63.3	61	se.	6	e.	10	T.	0.02	5 3	S. N.	se. se.	few.	Cu.	e.
24	30.15	30.12	73.0	72.5	77	69	63.4	61	64.0	63	e.	4	e.	12	0.00	T.	3	Cu.	e.	2	Cu.	e.
25	30.14	30.09	74.0	73.0	78	69	67.0	69	66.0	69	e.	8	e.	7	0.00	0.00	3	Cu.	e.	1	Cu.	e.
26	30.09	30.03	75.0	72.5	80	69	68.0	70	68.0	80	se.	3	e.	4	0.00	0.00	few.	Cu.	e.	9	Cu.	e.
27	30.02	30.00	73.2	71.0	77	69	69.0	81	68.0	86	e.	7	ne.	2	0.09	0.14	9	S.-cu.	e.	10	N.	ne.
28	30.00	29.96	73.0	72.5	78	70	66.7	72	66.0	71	e.	3	e.	6	0.03	T.	7	S.-cu.	e.	6 3	Cl.-s. Cu.	n. ne.
29																						
30																						
31																						
Mean....	30.046	30.025	72.5	72.0	77.3	67.9	66.1	71.9	66.1	75.7	e.	7.6	e.	7.3	5.23	0.86	4.7	Cu.	e.	4.0	Cu.	e.

Observations are made at 8 a. m. and 8 p. m., local standard time, which is that of 157° 30′ west, and is 5h and 30m slower than 75th meridian time. *Pressure values are reduced to sea level and standard gravity.

Chart I. Hydrographs for Seven Principal Rivers of the United States, February, 1907.

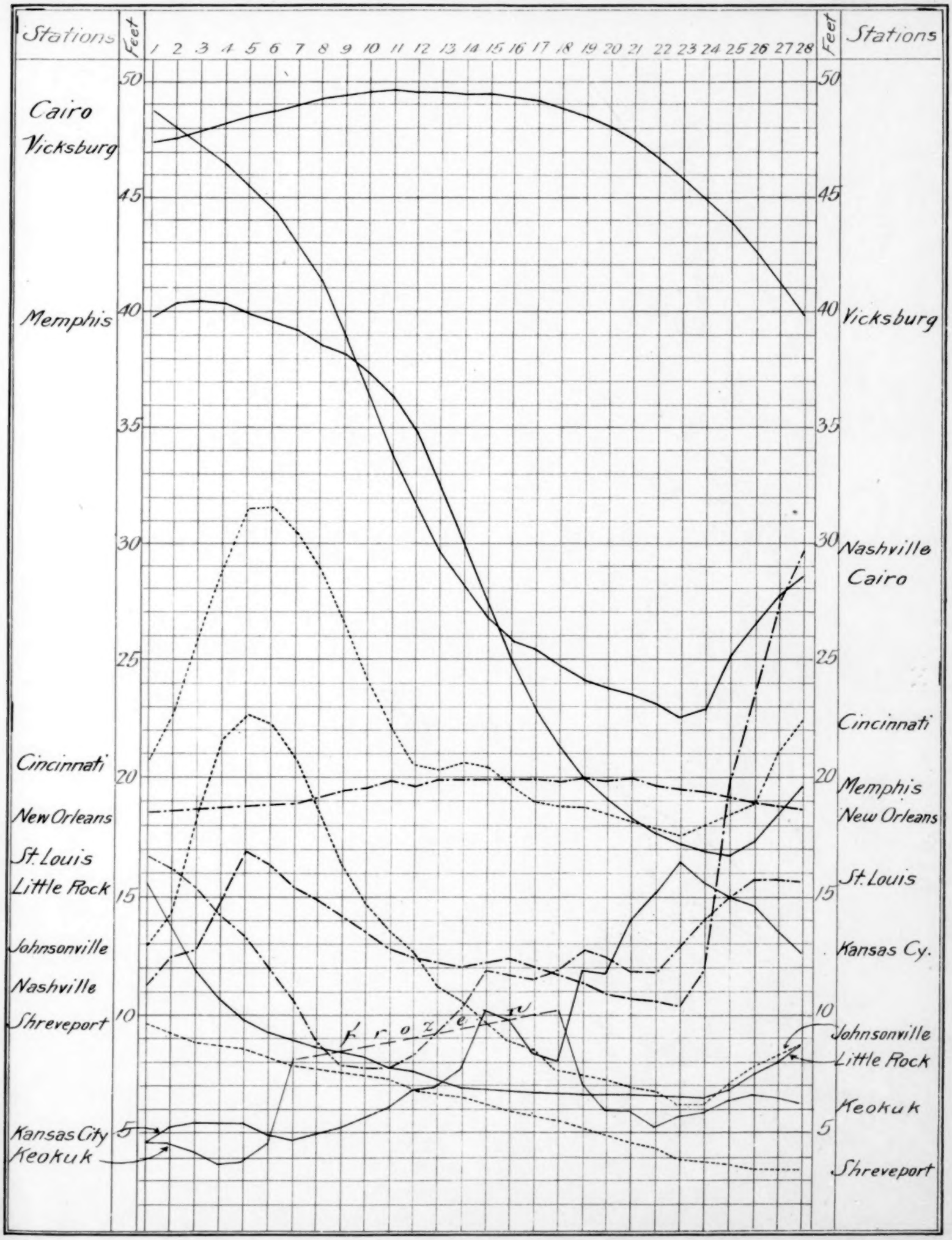


Chart II. Tracks of Centers of High Areas, February, 1907.

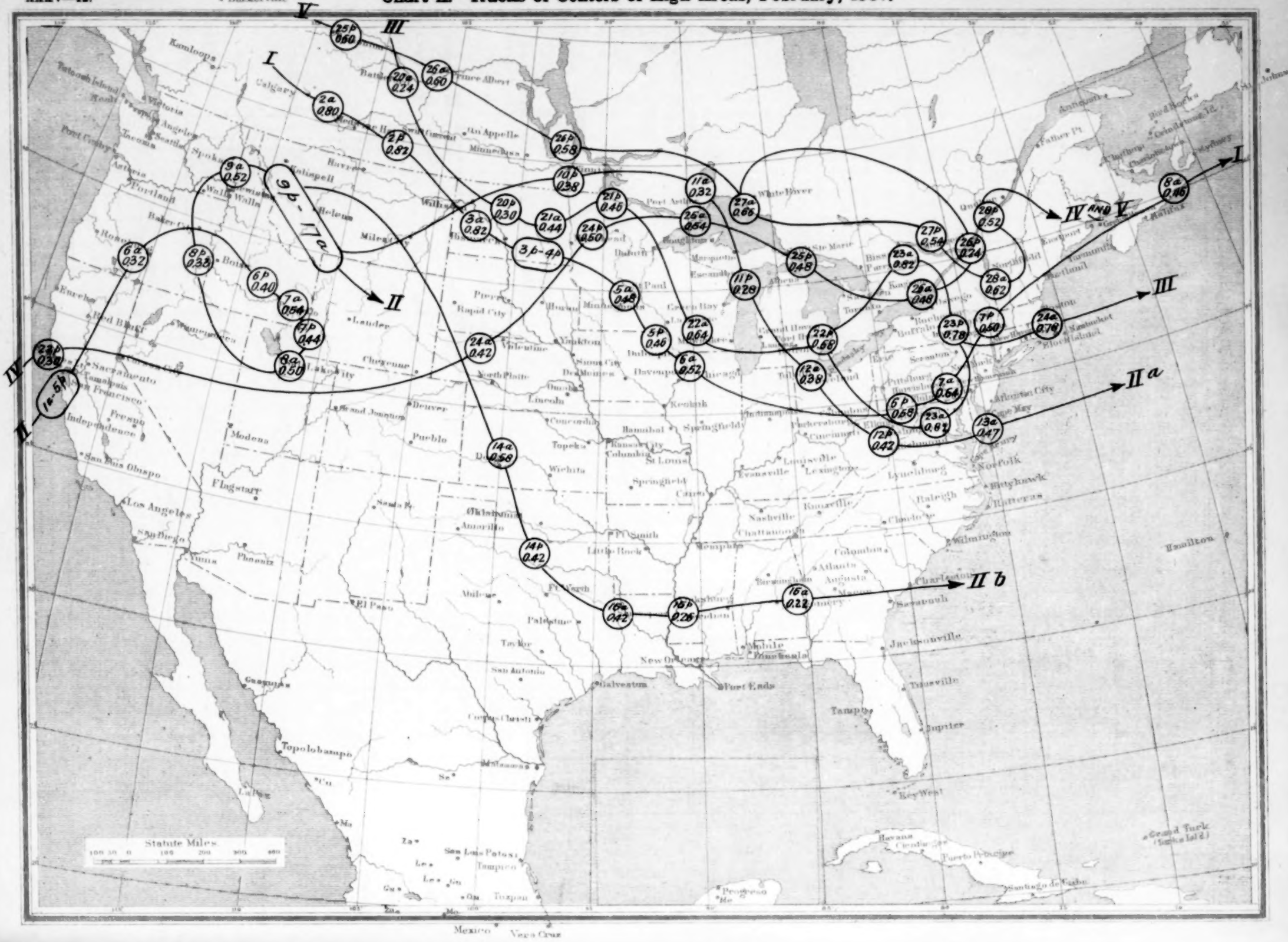
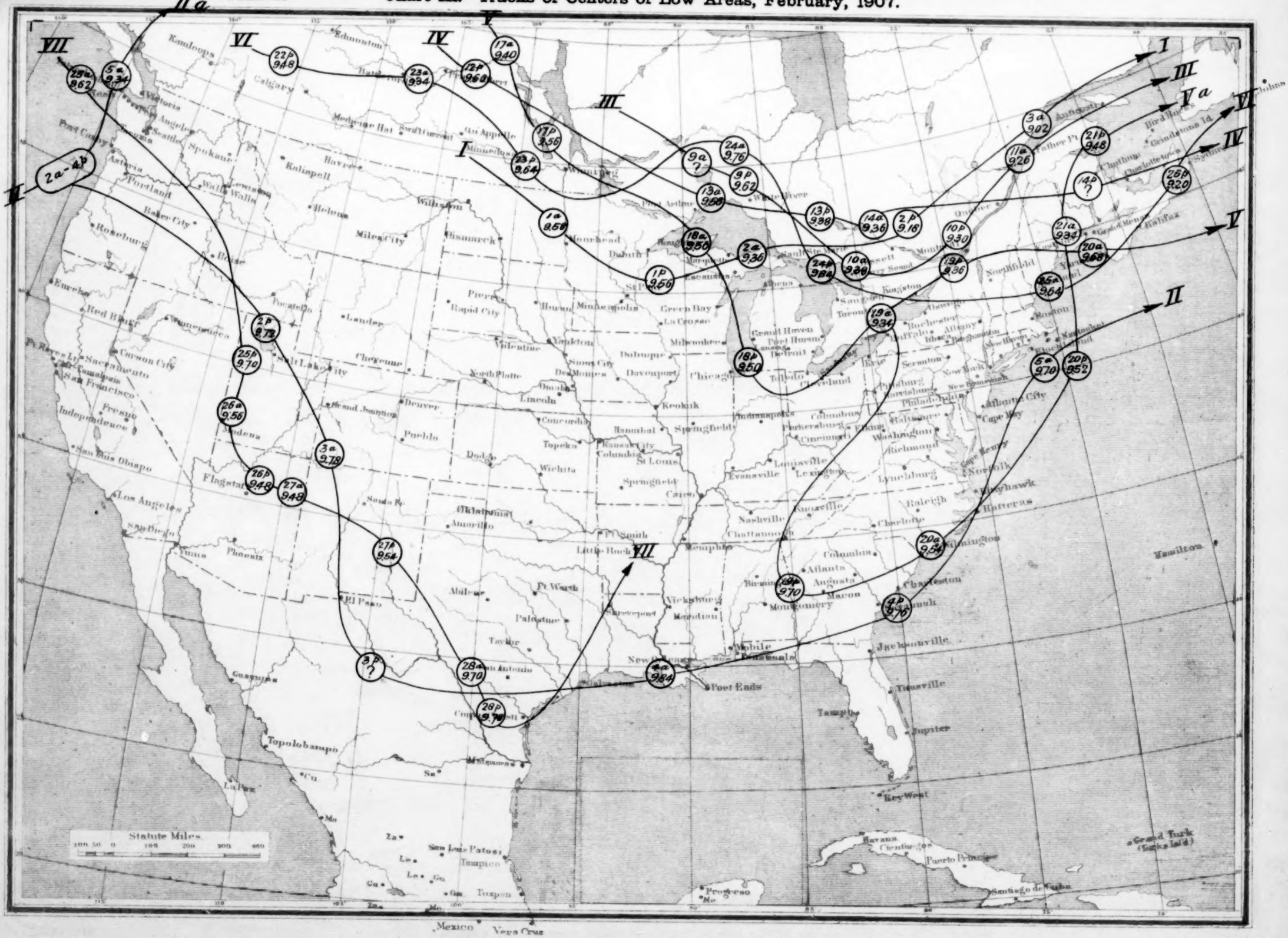


Chart III. Tracks of Centers of Low Areas, February, 1907.



• Barkerville

Chart IV. Total Precipitation, February, 1907.

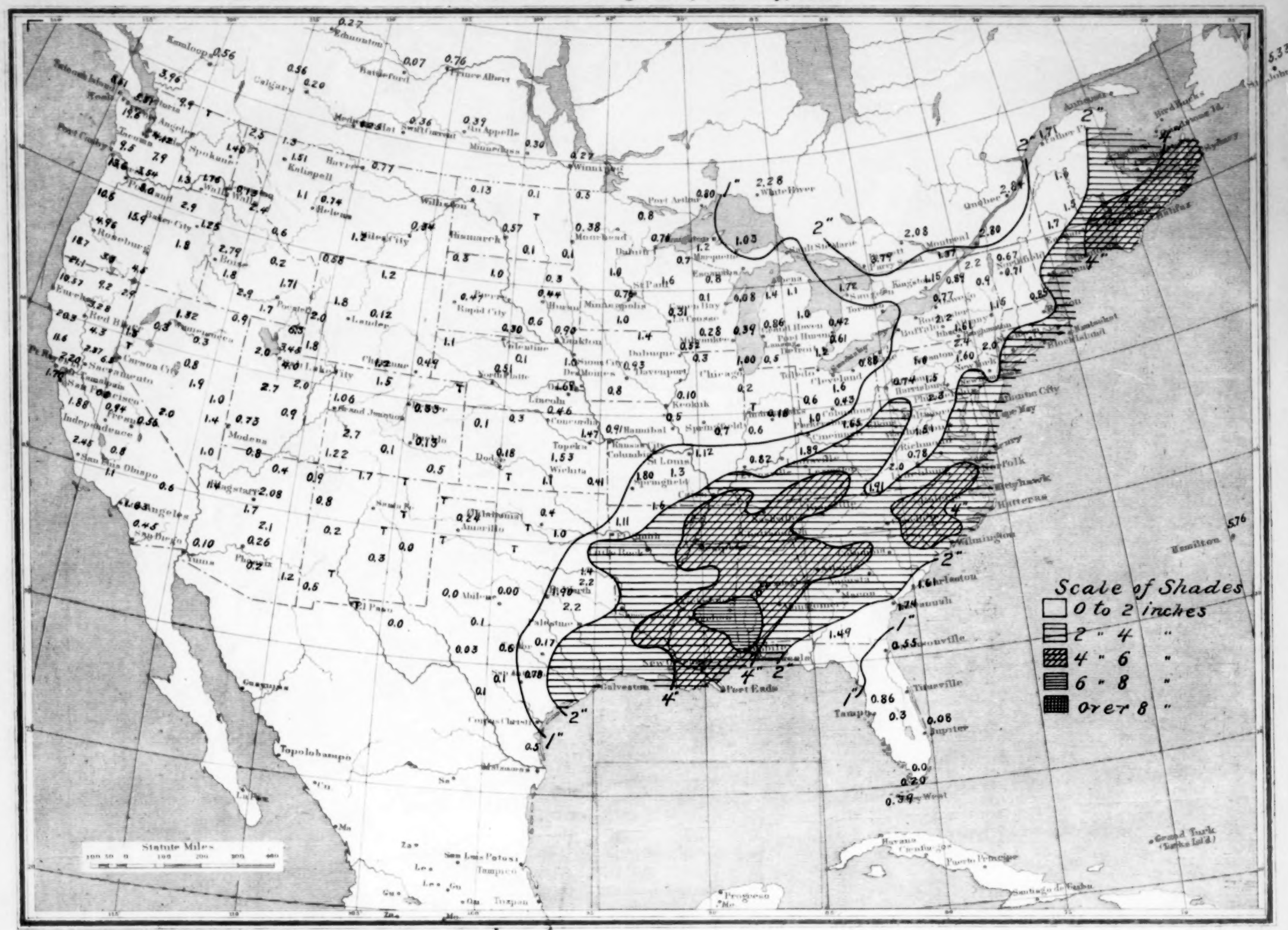


Chart V. Percentage of Clear Sky between Sunrise and Sunset, February, 1907.

Chart V. Percentage of Clear Sky between Sunrise and Sunset, February, 1907.

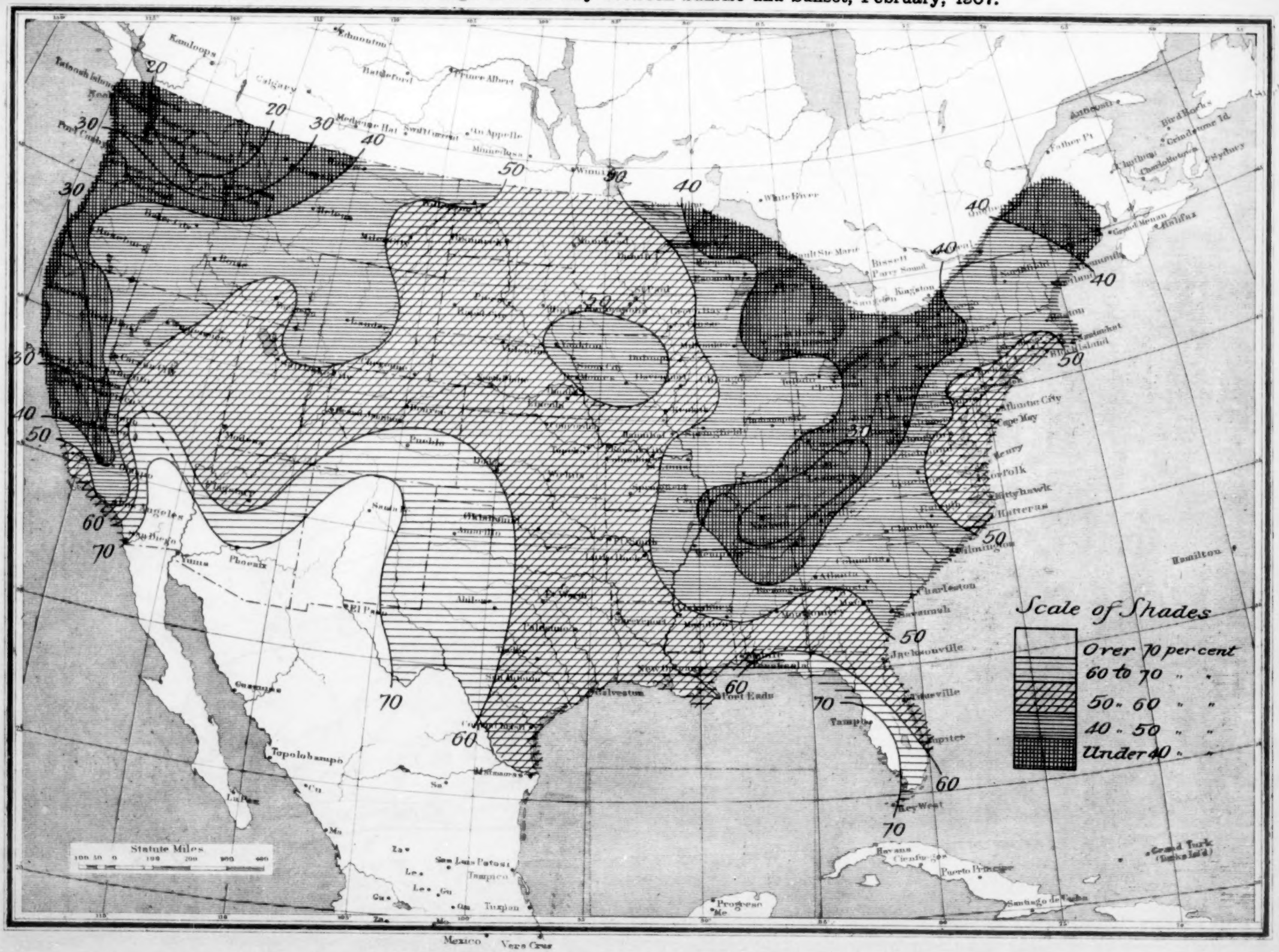


Chart VI. Isobars and Isotherms at Sea Level; Surface Wind Resultants, February, 1907.

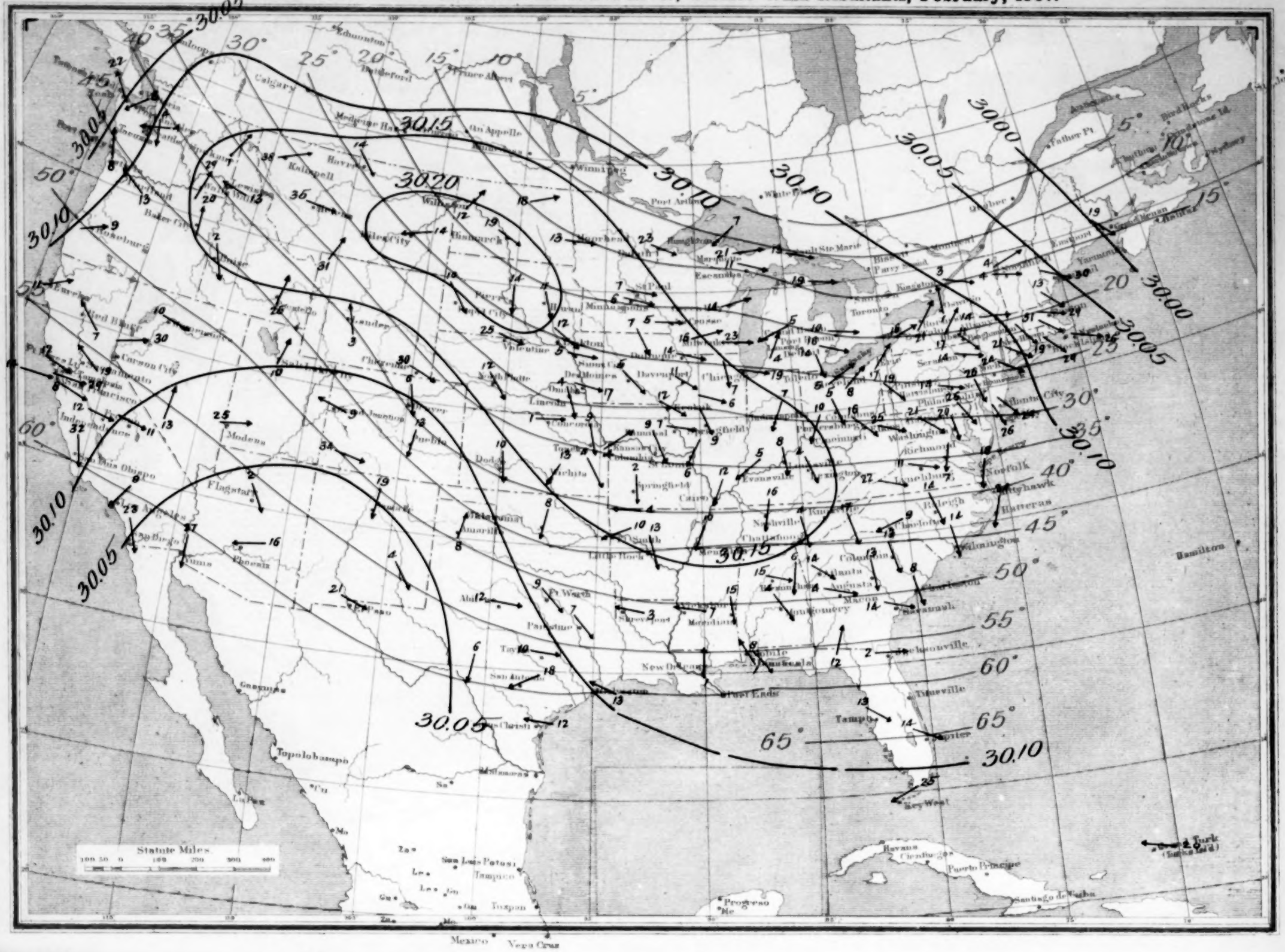
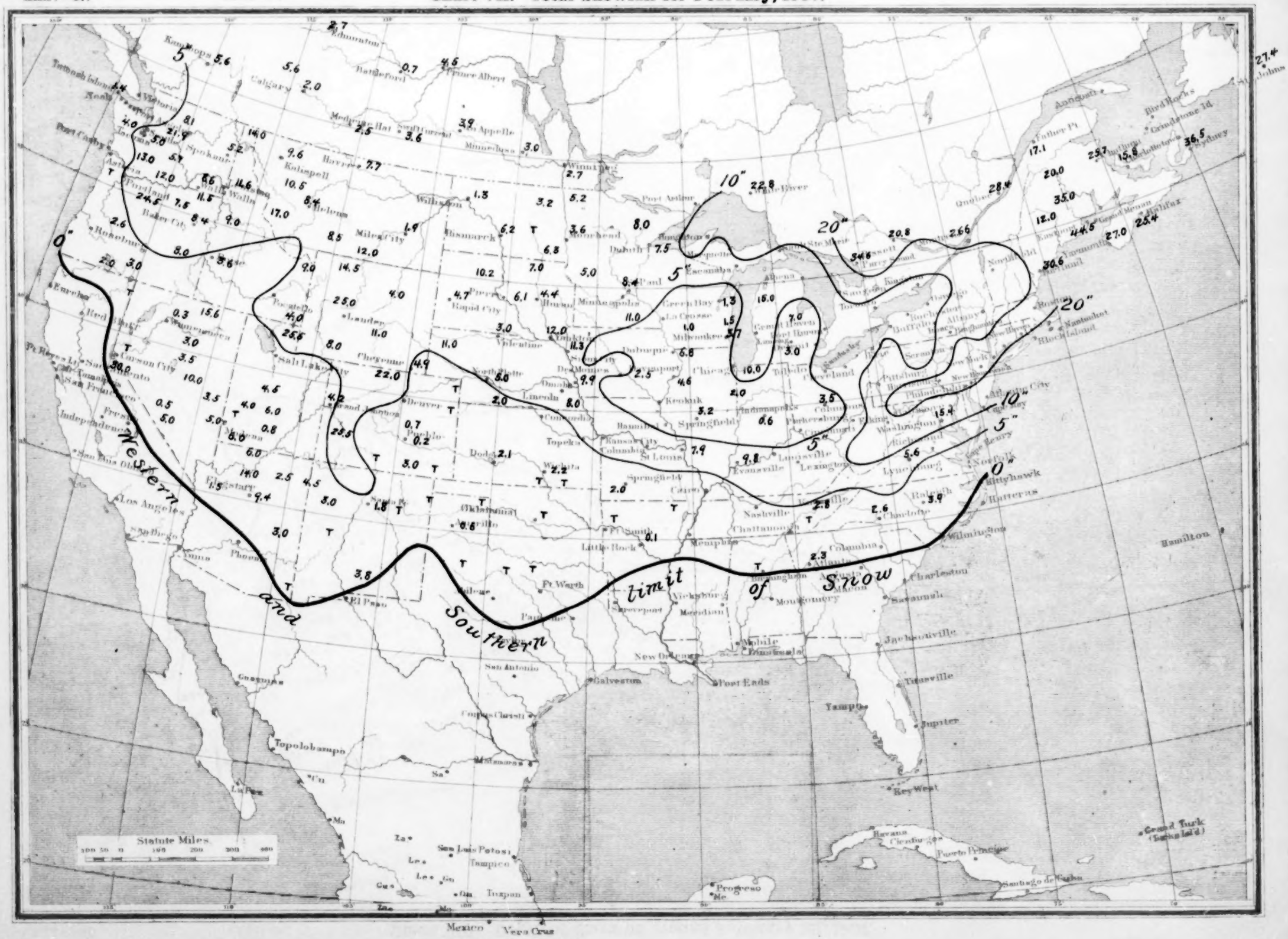


Chart VII. Total Snowfall for February, 1907.



• Barkerville

Chart VIII. Depth of Snow on ground February 28, 1907.

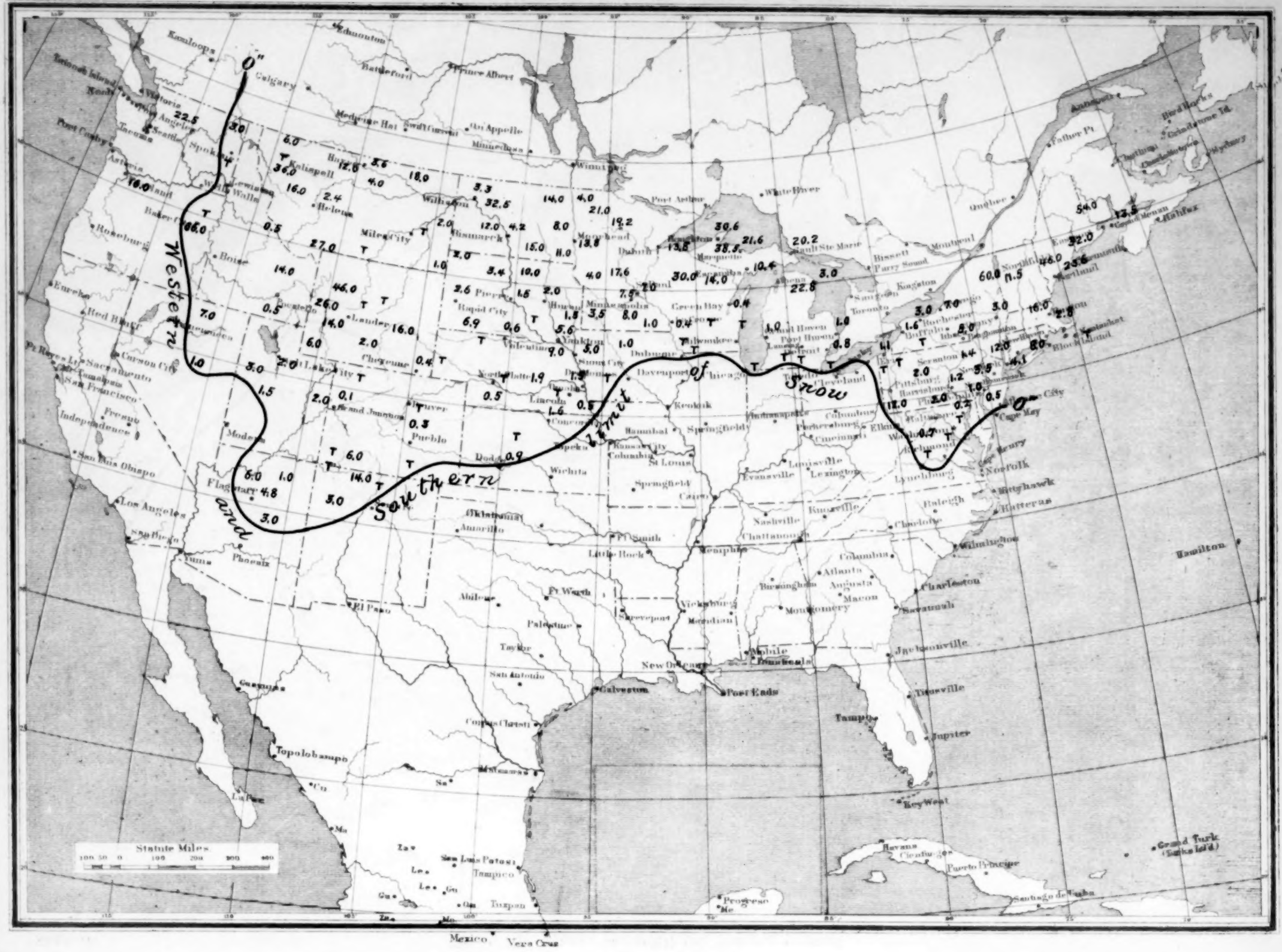
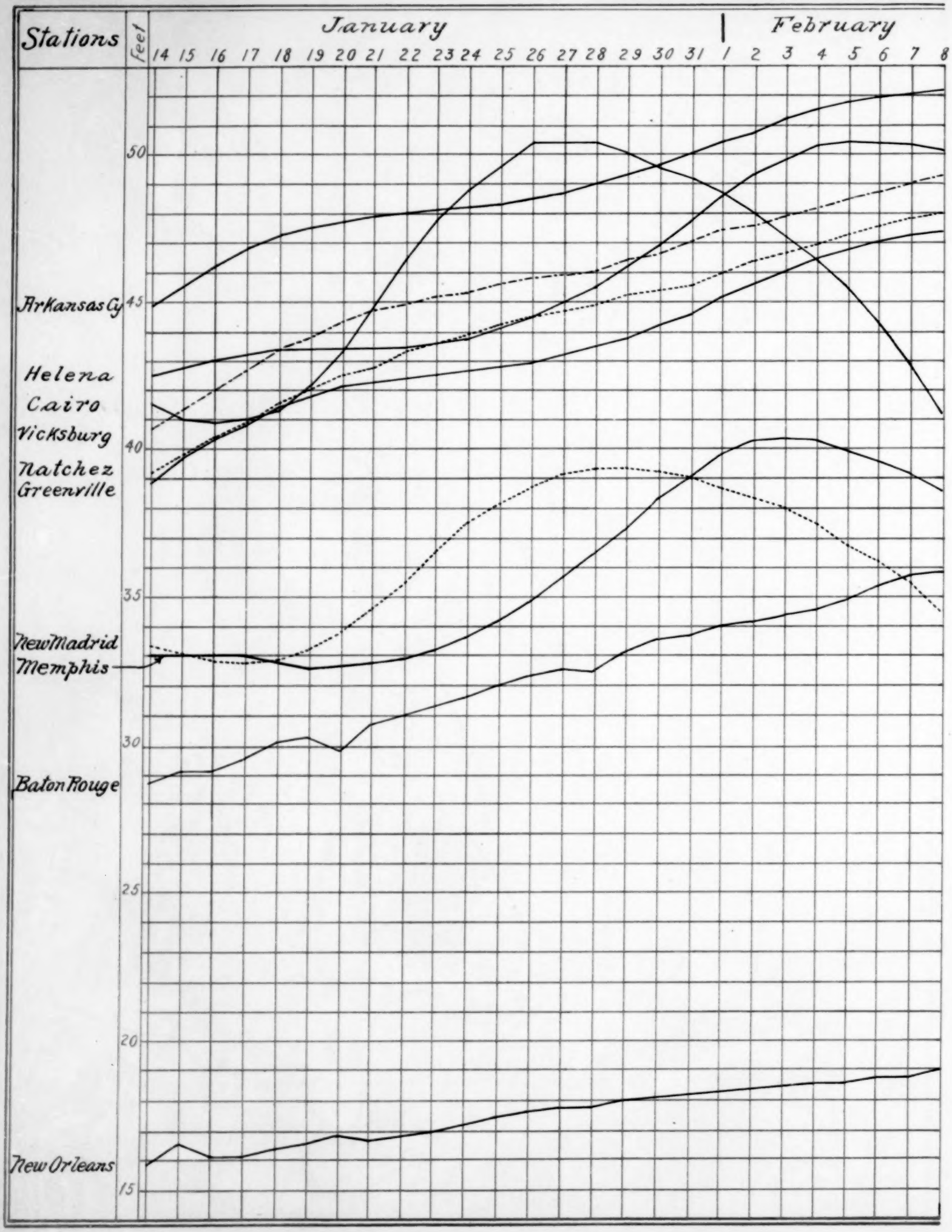
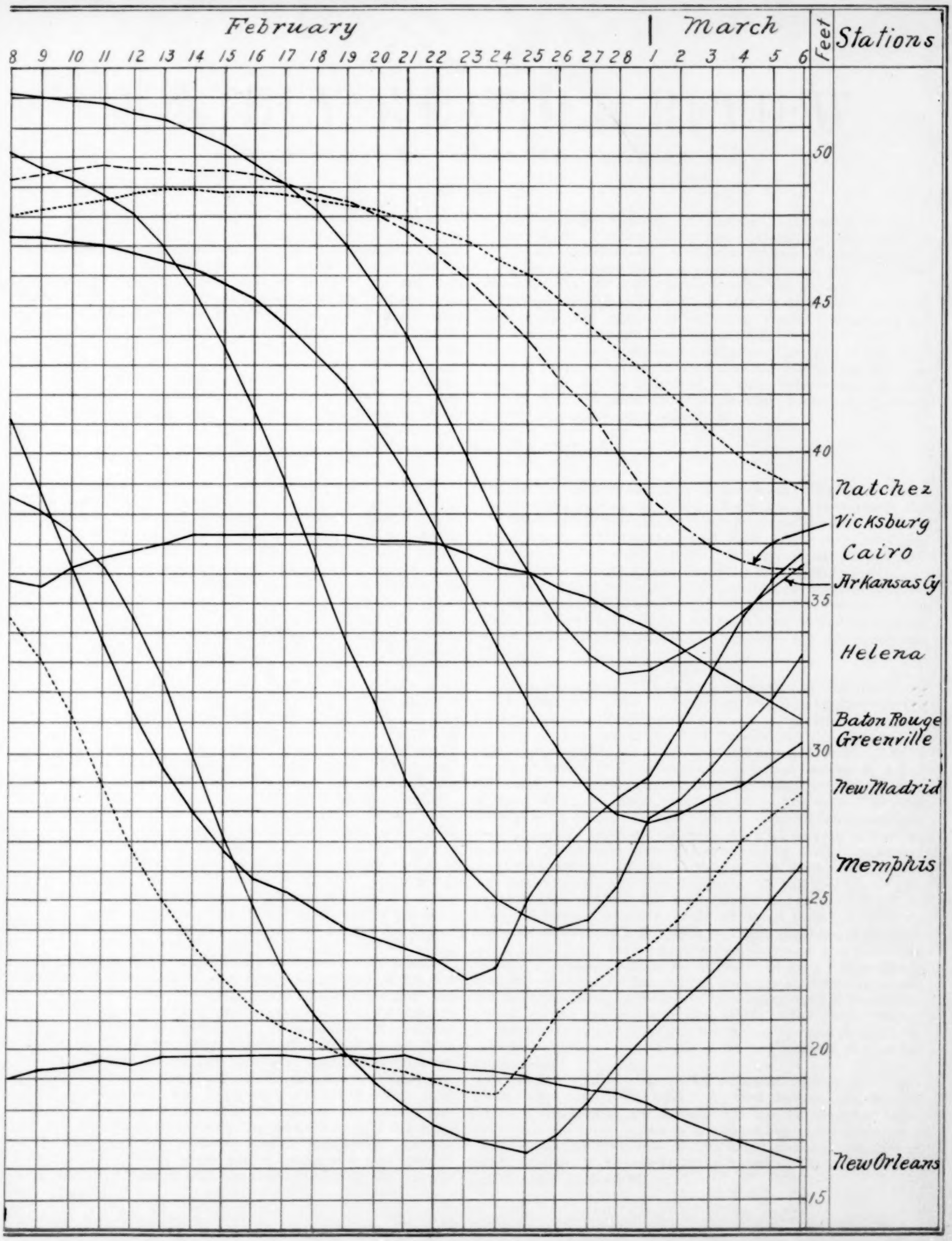


Chart IX. Hydrographs of the Lower



Mississippi River, January 14 to March 6, 1907.